

TWENTY - SECOND  
BIENNIAL REPORT  
of the  
Montana  
State Board of Health



For the Years  
1943 - 1944

VITAL STATISTICS FOR THE YEARS  
1942 - 1943

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# State of Montana

## State Board of Health

W. F. COGSWELL, Executive Officer  
HELENA, MONTANA

December 15, 1944

Governor S. C. Ford  
State Capitol  
Helena, Montana

Sir:

I herewith hand you the Twenty-second Biennial Report of the State Board of Health. In doing so, I wish to thank you most heartily for your support in all public health work.

Yours very truly,

W. F. COGSWELL, M. D.  
Executive Officer.



## **ADMINISTRATION DIVISION**

**W. F. Cogswell, M. D., Executive Officer**

While in recent years the State Board of Health has been practically free of politics, having received generous support from all political parties, the inauguration of the Merit System in August of 1939 makes it much easier for us to continue free of politics. A short description of the Merit System by Mr. Martinson, Supervisor of the System, follows. This Council has done an excellent job as far as the State Board of Health is concerned. It has been most helpful in passing regulations for the increases in salaries of competent and industrious employees, which has enabled the Board to hold such people in spite of attractive offers from other sources. I think it would be very difficult to find in any organization a more competent and loyal bunch of employees.

For the most part each division has a consulting committee from voluntary organizations directly concerned with the work of such divisions. These committees have been very helpful.

The State Board of Health has had splendid cooperation and support from other departments in the state. This is particularly so with the State Tuberculosis Sanitarium, the Livestock Sanitary Board, the Public Welfare Department, and the Department of Public Instruction, whose work sometimes overlaps that of the State Board of Health.

The Crippled Children's Division has been furnished office quarters in the building of the Public Welfare Department, and the employees of that department have been most courteous and cooperative. The surgeons doing operative work for the Crippled Children's Division are Doctor L. W. Allard, Billings, and Doctor J. K. Colman, Butte; recently Doctor S. L. Odgers, Butte, has been added to the staff. These surgeons hold clinics in the different parts of the state, and those children found in need of operative treatment are sent to hospitals in Butte, Helena and Billings. The crippled children's clinics are organized by our public health nurses in the different counties.

It is the intention of the State Board of Health to ask the coming legislature to create a tuberculosis division of the State Board of Health in order to cooperate with the United States Public Health Service in the control of this disease.

A detailed report from each of the divisions follows.

## JOINT MERIT SYSTEM COUNCIL

Helena, Montana  
December 6, 1944

Dr. W. F. Cogswell  
Executive Officer  
State Board of Health  
Helena, Montana

Dear Doctor Cogswell:

I am enclosing a short statement concerning the Merit System as it applies to the State Board of Health. If this is not just what you wanted, please let me know.

Sincerely yours,

MELVIN P. MARTINSON,  
Supervisor

## SELECTION OF PERSONNEL

Employees of the State Board of Health are selected through a State Merit System administered by the Merit System Council. This is in accordance with the provisions of the Federal Social Security Act as amended August 10, 1939, which requires that the State Board of Health must make its personnel selections on a merit basis. The Montana Merit System also serves the Unemployment Compensation Commission, the State Department of Public Welfare, and the United States Employment Service. The Council members are: Dr. Francis A. Thomson of Butte, Reverend Emmet J. Riley of Helena, Dr. E. Martin Larson of Great Falls, and Mr. Melvin P. Martinson is employed as the Supervisor for the System.

Under the Merit System all positions are classified with definite specifications as to duties and responsibilities as well as educational and experience requirements. A compensation plan stating minimum and maximum salaries and amounts of annual increase is, also, in effect for each class of position. New employees are selected on the basis of merit examinations.

The Merit System for the State Board of Health has been in effect since May 1940, and during that time, 188 persons have been certified to the State Board of Health by the Merit System Council as being eligible for employment. Of this number, 79 have been employed on a probationary basis. Persons who are interested in filing an application for any class of position with the State Board of Health can secure application blanks and information concerning the qualifications and salary ranges for these positions from the Merit System Council.

**DIVISION OF COMMUNICABLE DISEASES**

To: W. F. Cogswell, M. D., State Health Officer

The following is a biennial report of activities of the Division of Communicable Diseases and the Division of Rural Health Work for the period from November 1, 1942, to September 30, 1944.

The personnel of the department includes:

B. K. Kilbourne, M. D., Epidemiologist

Mary Caldwell, Senior Stenographer.

Ethel Rank, Junior Stenographer.

The incidence of communicable disease and the deaths resulting therefrom have been the lowest for any biennial period in the records of the State Board of Health.

The work of the department has consisted of field investigations of diseases threatening to appear in epidemic proportions, assistance to local health officers in controlling threatened epidemics, assistance in immunization campaigns and other control measures, and educational work as related to the spread and control of communicable disease. Accurate records have been kept of cases reported through local health officers showing the incidence of the various communicable diseases as they occurred throughout the state during this period.

The accompanying tables show the number of cases of communicable diseases reported to the State Board of Health. Table I shows the cases reported for the years 1942, 1943, and the first 9 months of 1944. Table II gives the record of the principal communicable diseases as reported in Montana for each year since 1920. The only diseases occurring in really epidemic proportions during the biennial period were influenza during December, 1943, and the first two months of 1944, and measles, an epidemic of which had started at the close of the preceding biennial period and continued through 1943 and into the early months of 1944.

**Tuberculosis.** The total number of cases reported during this biennium is slightly less than during the preceding biennium, although there is a slight rise in 1943 in the mortality rate. Table IV shows the number of cases during this period which were first reported by local physicians, by the State Sanitarium, by death certificate, and by out-of-state hospitals or clinics. The total number of cases reported for the period by sex and age groups will be found in Table III.

**Encephalitis.** There has been a marked decrease in the number of cases of encephalitis reported during this biennial period over the preceding period.

**Typhoid Fever.** The number of cases of typhoid fever during 1943 and the first 9 months of 1944 has reached an all-time low, 23 cases

being reported in 1943 and only 7 being reported in the first 9 months of 1944. The total for 1941 and 1942, the next lowest incidence for any biennial period, was 41 cases.

**Smallpox.** Smallpox has also continued to remain at a very low level, 17 cases having been reported in 1943 and the first 9 months of 1944 as compared with 7 cases for the years 1941 and 1942.

**Rocky Mountain Spotted Fever.** The year 1944 has shown the lowest incidence of this disease for any year of which the state has records, a total of 5 cases having been reported for the first 9 months of 1944 and 28 cases in 1943. No satisfactory explanation is offered for the extremely low incidence of this disease for this year, as the total immunizations in the state this year were not in excess of those that had been carried on for the past 5 or 6 years.

**Meningococcus Meningitis.** This is one of the diseases that has shown a slight increase since the previous biennial period, 67 cases having been reported in 1943 and the first 9 months of 1944 as compared with 22 cases for the years 1941 and 1942. The increase in the incidence of this disease in Montana is much lower than it has been in other states during the same period of time.

**Diphtheria.** The total number of cases of diphtheria reported was 70 in 1943 and 65 cases for the first 9 months of 1944, as compared with 212 cases for the years 1941 and 1942. The incidence of this disease in the state is still higher than it should be with the protective measures that are available for its control. There has been an increase in the number immunizations done, but there are still many areas in which a comparatively small per cent of the total persons susceptible have been immunized.

**Tularemia.** This disease showed the highest incidence in 1943 for any year for which records are available, a total of 53 cases having been reported. The source of contact in one-half of these cases was the skinning of dead muskrat or beaver; in 7 cases the sources of contact was the handling of rabbits; in the remainder of the cases the source of contact was tick bites or the handling of sheep. In the first 9 months of 1944 only 6 cases have been reported. A total of 58 cases were reported for the years 1941 and 1942.

**Sylvatic Plague.** During this biennial period the State Board of Health has continued to operate a laboratory truck for about 5 months each summer, investigating the incidence of bubonic plague in rodents. The United States Public Health Service also detailed a truck to eastern Montana for about 6 weeks in the summer of 1943. During 1943 new sources of infection among prairie dogs were found in Garfield and Custer counties. During 1944 the only new source of infection was found in fleas collected from prairie dogs in Big Horn County about 20 miles northeast of Hardin. This makes a total of 7 counties in which bubonic plague has been detected from the fleas of rodents or the rodents themselves, since 1936.

**Poliomyelitis.** Montana has been very fortunate in that poliomyelitis has not appeared in the epidemic proportions which have occurred in most other states in the Union, in either year of the biennial period. A total of 26 cases was reported in 1943 and 31 cases for the first 9 months of 1944. Of the cases occurring in 1944, 21 occurred in the month of September, which is unusually late for the onset of an epidemic. Unfortunately a high per cent of the bulbar type cases occurred in 1944. Table V shows the incidence by sex and age groups, and Table VI shows the incidence by month of onset.

### **VENEREAL DISEASES**

Venereal disease continues to be one of the major communicable disease problems. While there has been a slight improvement in reporting, it still does not reflect the true incidence of the disease.

The State Board of Health has continued to supply drugs for the treatment of syphilis to physicians upon request. During this biennial period requests have been received from 186 physicians for drugs to be used in the treatment of syphilis. As a result of these requests 23,792 doses of arsenicals and 23,627 doses of bismuth have been distributed to physicians and to the clinic at Great Falls. These drugs represented an expenditure of \$6,829.51 for the biennial period.

Since the beginning of mobilization it has been customary for the Armed Forces to report contacts of persons in the Armed Forces who have developed a venereal infection. The total contacts reported by the Army to the Board of Health as residing in Montana have been 409. These cases in most instances have been referred to local health officers for investigation and confirmation of the possible source of infection. In many instances the information is not sufficiently accurate that the suspected source of infection is located. The number that have actually been contacted through investigations has been 166.

No new clinics have been organized during the biennial period. The one at Great Falls is still operating. In other areas, local health officers and county physicians have been very helpful in providing treatment for cases who were unable to provide treatment for themselves.

As a result of Wassermann tests done on selectees since the beginning of mobilization, bloods from 86,685 persons in Montana have been examined. Of this total, 1,259 gave a positive reaction, or 1.4 per cent.

Tables VII and VIII show the reported incidence of syphilis during this biennial period by age, sex, and stage of the disease.

### **BIOLOGICALS**

The State Board of Health has continued to make available to local boards of health and to schools at State Board of Health prices, smallpox and typhoid vaccine and diphtheria toxoid for immunization against diphtheria. Tables IX and X show the number of immunizations for which material was furnished by the State Board of Health during the past biennial period.

**DIVISION OF RURAL HEALTH**

The Division of Rural Health is combined with the Division of Epidemiology, the Epidemiologist serving as Director of this division.

No new full-time local health departments have been organized during this period. Owing to the inability to obtain qualified health officers, two of the units that have previously been organized have had to operate this last year under the direction of a part-time health officer.

**Trainees.** During the biennial period, funds from Title VI of the Social Security Act were made available for training of personnel and were used for the training of 15 public health nurses.

TABLE I

**Communicable Diseases Reported in Montana**

Including Deaths from Communicable Diseases Not Previously Reported as Cases

| Diseases                     | 1942  | 1943  | 1944<br>(9 mo.) |
|------------------------------|-------|-------|-----------------|
| Anthrax                      |       |       |                 |
| Chickenpox                   | 1,602 | 1,898 | 1,594           |
| Diphtheria                   | 86    | 70    | 65              |
| Dysentery, Amoebic           | 2     | 1     | 2               |
| Dysentery, Bacillary         | 2     | 7     | 2               |
| Encephalitis, Epidemic       | 21    | 8     | 9               |
| Influenza                    | 356   | 6,074 | 5,979           |
| Malaria                      | 1     | 7     | 23              |
| Measles                      | 3,150 | 5,767 | 3,769           |
| Meningitis, Meningococcus    | 12    | 31    | 36              |
| Mumps                        | 3,194 | 2,647 | 1,419           |
| Pneumonia                    | 135   | 389   | 301             |
| Poliomyelitis                | 13    | 26    | 31              |
| Rocky Mountain Spotted Fever | 45    | 28    | 5               |
| Scarlet Fever                | 697   | 690   | 1,194           |
| Septic Sore Throat           | 79    | 49    | 81              |
| Smallpox                     | 3     | 7     | 10              |
| Tuberculosis                 | 402   | 386   | 376             |
| Tularemia                    | 25    | 53    | 6               |
| Typhoid Fever                | 15    | 23    | 7               |
| Undulant Fever               | 5     | 11    | 11              |
| Whooping Cough               | 993   | 1,032 | 555             |
| Gonorrhea                    | 223   | 417   | 202             |
| Syphilis                     | 546   | 421   | 341             |
| Tetanus                      |       | 15    | 25              |
| Trachoma                     |       |       | 3               |

TABLE II  
Record of Certain Important Diseases from 1920  
Number of Cases Reported Each Year

| Year         | Tuber-<br>culosis | Ty-<br>phoid | Diph-<br>theria | Small-<br>pox | Scarlet<br>Fever | Menin-<br>gitis | Polio-<br>myelitis | Spot'd<br>Fever | Meas-<br>les |
|--------------|-------------------|--------------|-----------------|---------------|------------------|-----------------|--------------------|-----------------|--------------|
| 1920         | 863               | 241          | 269             | 1,056         | 891              | 19              | 25                 | 26              | 4,491        |
| 1921         | 568               | 187          | 412             | 1,466         | 620              | 12              | 26                 | 26              | 2,561        |
| 1922         | 368               | 144          | 426             | 636           | 676              | 23              | 47                 | 58              | 67           |
| 1923         | 604               | 159          | 456             | 732           | 843              | 21              | 16                 | 51              | 2,535        |
| 1924         | 648               | 130          | 548             | 950           | 1,040            | 16              | 182                | 47              | 6,049        |
| 1925         | 620               | 244          | 329             | 376           | 1,337            | 12              | 41                 | 34              | 486          |
| 1926         | 528               | 117          | 208             | 395           | 2,065            | 42              | 12                 | 37              | 2,596        |
| 1927         | 463               | 108          | 182             | 575           | 2,209            | 165             | 22                 | 38              | 1,372        |
| 1928         | 448               | 133          | 231             | 853           | 846              | 188             | 65                 | 32              | 840          |
| 1929         | 536               | 371          | 142             | 547           | 1,139            | 149             | 7                  | 23              | 4,308        |
| 1930         | 534               | 120          | 77              | 379           | 1,355            | 62              | 20                 | 22              | 664          |
| 1931         | 579               | 137          | 105             | 129           | 1,223            | 31              | 58                 | 34              | 1,634        |
| 1932         | 568               | 142          | 32              | 142           | 868              | 18              | 9                  | 100             | 5,476        |
| 1933         | 465               | 184          | 106             | 33            | 612              | 10              | 13                 | 68              | 2,178        |
| 1934         | 638               | 136          | 178             | 19            | 628              | 22              | 321                | 74              | 2,105        |
| 1935         | 432               | 81           | 145             | 749           | 1,975            | 35              | 7                  | 125             | 7,397        |
| 1936         | 497               | 123          | 85              | 762           | 3,579            | 48              | 12                 | 65              | 457          |
| 1937         | 486               | 96           | 62              | 898           | 1,328            | 23              | 31                 | 31              | 656          |
| 1938         | 515               | 80           | 50              | 314           | 1,000            | 17              | 14                 | 12              | 3,405        |
| 1939         | 455               | 57           | 86              | 55            | 1,036            | 6               | 6                  | 32              | 7,498        |
| 1940         | 451               | 32           | 117             | 8             | 1,044            | 16              | 108                | 32              | 1,310        |
| 1941         | 466               | 26           | 133             | 4             | 1,047            | 10              | 33                 | 107             | 951          |
| 1942         | 402               | 15           | 86              | 3             | 697              | 12              | 13                 | 45              | 3,150        |
| 1943         | 386               | 23           | 70              | 7             | 690              | 31              | 26                 | 28              | 5,767        |
| 1944 (9 mo.) | 376               | 7            | 65              | 10            | 1,194            | 36              | 31                 | 5               | 3,769        |

TABLE III  
Tuberculosis Cases Reported in 1943 and 9 Months of 1944  
By Sex and Age Groups

| Age Groups    | 1943 |        |       | 1944 (9 mo.) |        |       |
|---------------|------|--------|-------|--------------|--------|-------|
|               | Male | Female | Total | Male         | Female | Total |
| 0-4           | 10   | 10     | 20    | 9            | 10     | 19    |
| 5-9           | 1    | 3      | 4     | 5            | 4      | 9     |
| 10-14         | 5    | 4      | 9     | 4            | 9      | 13    |
| 15-19         | 3    | 15     | 18    | 6            | 4      | 10    |
| 20-29         | 16   | 16     | 32    | 10           | 18     | 28    |
| 30-39         | 14   | 16     | 30    | 10           | 9      | 19    |
| 40-49         | 19   | 7      | 26    | 21           | 8      | 29    |
| 50-59         | 47   | 7      | 54    | 23           | 0      | 23    |
| 60-69         | 19   | 4      | 23    | 20           | 3      | 23    |
| 70-Over       | 6    | 6      | 12    | 13           | 5      | 18    |
| Age Not Given | 104  | 52     | 156   | 129          | 56     | 185   |
| Total         | 243  | 141    | 384   | 250          | 126    | 376   |

TABLE IV  
Sources of Original Report of Tuberculosis Cases  
In 1943 and 9 Months of 1944

| Year         | Local<br>Physician | Sanitarium | Death<br>Certificate | Other | Total |
|--------------|--------------------|------------|----------------------|-------|-------|
| 1943         | 119                | 146        | 98                   | 21    | 384   |
| 1944 (9 mo.) | 89                 | 125        | 83                   | 79    | 376   |

TABLE V

**Poliomyelitis—1944 (9 mo.)**  
**By Sex and Age Groups**

| Age Group | SEX  |        |       |
|-----------|------|--------|-------|
|           | Male | Female | Total |
| 0-9       | 8    | 2      | 10    |
| 10-19     | 8    | 5      | 13    |
| 20-29     | 1    | 4      | 5     |
| 30-39     | 1    | 2      | 3     |
| Total     | 18   | 13     | 31    |

TABLE VI

**Poliomyelitis—1944 (9 mo.)**  
**By Month of Onset**

| Month     | Cases |
|-----------|-------|
| January   | 0     |
| February  | 0     |
| March     | 0     |
| April     | 1     |
| May       | 1     |
| June      | 0     |
| July      | 3     |
| August    | 5     |
| September | 21    |
| Total     | 31    |

TABLE VII

**Syphilis Cases Reported in 1943**  
**By Age Groups, Sex and Stage of Disease**

| Age Groups   | MALE    |                |               |               |       | FEMALE  |                |               |               |       |
|--------------|---------|----------------|---------------|---------------|-------|---------|----------------|---------------|---------------|-------|
|              | Primary | Sec-<br>ondary | Terti-<br>ary | Not<br>Stated | Total | Primary | Sec-<br>ondary | Terti-<br>ary | Not<br>Stated | Total |
| 0-14         | 0       | 0              | 0             | 5             | 5     | 0       | 0              | 0             | 2             | 2     |
| 15-24        | 13      | 4              | 5             | 4             | 26    | 7       | 11             | 13            | 9             | 40    |
| 25-39        | 14      | 6              | 41            | 8             | 69    | 6       | 14             | 35            | 9             | 64    |
| 40-59        | 4       | 15             | 65            | 5             | 89    | 2       | 6              | 22            | 2             | 32    |
| 60-Over      | 2       | 1              | 29            | 1             | 33    | 0       | 0              | 7             | 0             | 7     |
| No Age Given | 5       | 5              | 3             | 13            | 26    | 1       | 2              | 10            | 15            | 28    |
| Total        | 38      | 31             | 143           | 36            | 248   | 16      | 33             | 87            | 37            | 173   |

TABLE VIII

**Syphilis Cases Reported in 1944 (9 mo.)**  
**By Age Groups, Sex and Stage of Disease**

| Age Groups   | MALE    |                |               |               |       | FEMALE  |                |               |               |       |
|--------------|---------|----------------|---------------|---------------|-------|---------|----------------|---------------|---------------|-------|
|              | Primary | Sec-<br>ondary | Terti-<br>ary | Not<br>Stated | Total | Primary | Sec-<br>ondary | Terti-<br>ary | Not<br>Stated | Total |
| 0-14         | 0       | 0              | 1             | 2             | 3     | 1       | 1              | 0             | 1             | 3     |
| 15-24        | 7       | 4              | 4             | 12            | 27    | 6       | 5              | 9             | 16            | 36    |
| 25-39        | 7       | 11             | 29            | 9             | 56    | 4       | 10             | 22            | 12            | 48    |
| 40-59        | 2       | 6              | 38            | 10            | 56    | 1       | 6              | 13            | 3             | 23    |
| 60-Over      | 1       | 3              | 17            | 1             | 22    | 0       | 1              | 4             | 2             | 7     |
| No Age Given | 3       | 2              | 10            | 24            | 39    | 0       | 0              | 6             | 15            | 21    |
| Total        | 20      | 26             | 99            | 58            | 203   | 12      | 23             | 54            | 49            | 138   |

TABLE IX

**Amount of Various Immunization Materials Distributed  
by State Board of Health—1943**

| Month               | Diphtheria<br>Toxoid | Smallpox<br>Vaccine | Typhoid<br>Vaccine | Pertussis<br>Vaccine | Scarlet Fever<br>Immuniz. |
|---------------------|----------------------|---------------------|--------------------|----------------------|---------------------------|
| January             | 900                  | 385                 | ----               | 25                   | ----                      |
| February            | 730                  | 385                 | ----               | 25                   | ----                      |
| March               | 450                  | 275                 | 80                 | 100                  | ----                      |
| April               | 1,830                | 680                 | 105                | 75                   | ----                      |
| May                 | 900                  | 320                 | ----               | 150                  | ----                      |
| June                | 60                   | 85                  | 82½                | 150                  | ----                      |
| July                | 50                   | 50                  | ----               | 275                  | ----                      |
| August              | 840                  | 540                 | ----               | 350                  | ----                      |
| September           | 1,200                | 110                 | ----               | 375                  | ----                      |
| October             | 810                  | 245                 | ----               | 75                   | ----                      |
| November            | 420                  | 445                 | ----               | 625                  | ----                      |
| December            | 540                  | 185                 | 80                 | 150                  | ----                      |
| Total Immunizations | 8,780                | 3,705               | 347½               | 2,375                | ----                      |

TABLE X

**Amount of Various Immunization Materials Distributed  
by State Board of Health—1944 (9 mo.)**

| Month               | Diphtheria<br>Toxoid | Smallpox<br>Vaccine | Typhoid<br>Vaccine | Pertussis<br>Vaccine | Scarlet Fever<br>Immuniz. |
|---------------------|----------------------|---------------------|--------------------|----------------------|---------------------------|
| January             | 60                   | 25                  | 80                 | ----                 | ----                      |
| February            | 210                  | 115                 | ----               | 75                   | ----                      |
| March               | 510                  | 35                  | 500                | ----                 | ----                      |
| April               | 1,230                | 730                 | 60                 | 50                   | ----                      |
| May                 | 213                  | 110                 | ----               | 125                  | ----                      |
| June                | 450                  | 160                 | ----               | 100                  | ----                      |
| July                | ----                 | 20                  | ----               | 25                   | ----                      |
| August              | 360                  | 125                 | ----               | 225                  | ----                      |
| September           | 2,460                | 980                 | ----               | 350                  | ----                      |
| Total Immunizations | 5,493                | 2,300               | 640                | 950                  | ----                      |

**BUREAU OF VITAL STATISTICS**

To W. F. Cogswell, M. D., Executive Officer, Montana State Board of Health:

Sir: It is my privilege and honor to submit the Biennial Report of the Bureau of Vital Statistics for your consideration. This report covers the calendar years 1942 and 1943.

The personnel of the bureau includes the State Registrar, two senior stenographers, one intermediate stenographer, one junior stenographer and one senior clerk.

The Bureau of Vital Statistics was created by the legislature of 1907 and became effective June 1st of that year. It was created for the complete and proper registration of births and deaths for legal, sanitary and statistical purposes. The Bureau was placed under the superintendance of the Secretary of the State Board of Health who was empowered to make regulations, with the approval of the Board of Health, to carry out the provisions of the act.

The legislature of 1943 repealed the Vital Statistics Registration Act of 1907, and reenacted the present law which includes, not only the central registration of births and deaths, but also stillbirths, legitimations, adoptions, marriages, divorces and annulments of marriages. Thus for the first time there is a complete history of the principal events in the lives of the citizens of the state from the "cradle to the grave." Legislation was also passed in 1943 allowing any citizen, regardless of the place of birth, to place his birth on record in Montana by court order. The law further regulates the use of Vital Statistics records as evidence, defines terms, provides penalties and authorizes the State Board of Health to make regulations for the enforcement of the Act.

There is one local registrar of births and deaths in each county, and where necessary for convenience and to prevent undue delay in the filing of records there are additional local registrars for districts within a county. The local registrars are appointed by the State Registrar with approval of the Board of Health. The attendant at a birth must report the birth to the local registrar within ten days after the birth occurs. The mortician who handles a dead body must present a death certificate to the local registrar and receive a burial transit permit before a body may be in any way disposed. The local registrar must send in all original birth, death and stillbirth certificates to the State Board of Health by the 10th of each month for the preceding month and a duplicate record is filed with the county clerk and recorder.

Clerks of the District Court must report the marriage licenses issued, the divorces or annulments and adoptions occurring in his court, by the 15th of the following month.

Death reporting became accurate and complete much more rapidly than did birth reporting. Montana was admitted to the United States Registration Area for deaths in 1910, when it was proved to the Federal

Census Bureau that we were registering over 90 per cent of the deaths occurring in the state. Satisfactory birth reporting was not reached until late in the 1910 decade. In 1921 the Census Bureau tested our accuracy of birth reporting and found we were recording 93 per cent of the births occurring and we were accordingly admitted as the twenty-fourth state to the Birth Registration Area on January 1, 1922. A recent check of the birth reporting carried on in conjunction with the Federal Census of 1940 revealed that 97.6 per cent of our births were being properly recorded. Montana was the 11th state in completeness of registration. Only three counties fell below 90 per cent, namely, Big Horn, Stillwater and Toole. Seven showed between 90 and 95 per cent, they being Broadwater, Fallon, Garfield, Glacier, Lake, Musselshell and Roosevelt. Of these ten, four embraced large areas of Indian reservations where the reporting of Vital Statistics is quite a problem. The other 46 counties registered over 95 per cent of their births.

### POPULATION

Montana's population decreased by 88,000 or 15.8 per cent between April 1, 1940, the date of the last census, and November 1, 1943, based on the civilian population registration for the War Ration Book No. 4. The figures were released by the Census Bureau and show that the civilian population for the whole country decreased by 4,000,000, or 3.1 per cent between these dates. Throughout this report the 1942 state rates are based on 560,000 population, while the 1943 rates are on 484,000 mid-year estimate of Census Bureau.

Table I, following shows the counties, the estimated population November 1, 1943 (War Ration Book No. 4), the census April 1, 1940, the estimated change and percentage change.

TABLE I

| COUNTY          | ESTIMATED CIVILIAN POPULATION |                | ESTIMATED CHANGE, APRIL 1, 1940 to NOV. 1, 1943 |              |
|-----------------|-------------------------------|----------------|---|--------------|
|                 | Nov. 1, 1943                  | April 1, 1940  | Number  | Per Cent     |
| <b>TOTAL</b>    | <b>470,033</b>                | <b>558,270</b> | <b>-88,237</b>                                  | <b>-15.8</b> |
| Beaverhead      | 5,547                         | 6,943          | -1,396  | -20.0        |
| Big Horn        | 8,494                         | 10,419         | -1,925  | -18.5        |
| Blaine          | 7,739                         | 9,566          | -1,827  | -19.1        |
| Broadwater      | 2,228                         | 3,451          | -1,223  | -35.4        |
| Carbon          | 9,187                         | 11,865         | -2,678  | -22.6        |
| Carter          | 2,633                         | 3,280          | -647  | -19.7        |
| Cascade         | 42,016                        | 41,999         | +17   | 0            |
| Chouteau        | 5,541                         | 7,316          | -1,775  | -24.3        |
| Custer          | 9,220                         | 10,422         | -1,202  | -11.5        |
| Daniels         | 3,580                         | 4,563          | -983  | -21.5        |
| Dawson          | 7,598                         | 8,618          | -1,202  | -11.8        |
| Deer Lodge      | 14,061                        | 13,627         | +434  | +3.2         |
| Fallon          | 3,063                         | 3,719          | -656  | -17.6        |
| Fergus          | 11,491                        | 14,040         | -2,549  | -18.2        |
| Flathead        | 19,367                        | 24,271         | -4,904  | -20.2        |
| Gallatin        | 14,934                        | 18,269         | -3,335  | -18.3        |
| Garfield        | 1,999                         | 2,641          | -642  | -24.3        |
| Glacier         | 7,949                         | 9,034          | -1,085  | -12.0        |
| Golden Valley   | 1,144                         | 1,607          | -463  | -28.8        |
| Granite         | 2,605                         | 3,401          | -796  | -23.4        |
| Hill            | 11,108                        | 13,304         | -2,196  | -16.5        |
| Jefferson       | 3,444                         | 4,664          | -1,220  | -26.2        |
| Judith Basin    | 3,094                         | 3,655          | -561  | -15.3        |
| Lake            | 9,911                         | 13,490         | -3,579  | -26.5        |
| Lewis and Clark | 18,083                        | 22,131         | -4,048  | -18.3        |
| Liberty         | 1,676                         | 2,209          | -533  | -24.1        |
| Lincoln         | 6,354                         | 7,882          | -1,528  | -19.4        |
| McCone          | 2,562                         | 3,798          | -1,236  | -32.5        |
| Madison         | 4,979                         | 7,294          | -2,315  | -31.7        |
| Meagher         | 1,615                         | 2,237          | -622  | -27.8        |
| Mineral         | 1,617                         | 2,135          | -518  | -24.3        |
| Missoula        | 24,187                        | 27,852         | -3,665  | -13.2        |
| Musselshell     | 4,564                         | 5,717          | -1,153  | -20.2        |
| Park            | 9,474                         | 11,566         | -2,092  | -18.1        |
| Petroleum       | 831                           | 1,083          | -252  | -23.3        |
| Phillips        | 5,906                         | 7,892          | -1,986  | -25.2        |
| Pondera         | 5,394                         | 6,716          | -1,322  | -19.7        |
| Powder River    | 2,463                         | 3,159          | -696  | -22.0        |
| Powell          | 5,651                         | 6,152          | -501  | -8.1         |
| Prairie         | 2,075                         | 2,410          | -335  | -13.9        |
| Ravalli         | 10,206                        | 12,978         | -2,772  | -21.4        |
| Richland        | 8,737                         | 10,209         | -1,472  | -14.4        |
| Roosevelt       | 8,696                         | 9,806          | -1,110  | -11.3        |
| Rosebud         | 5,644                         | 6,477          | -833  | -12.9        |
| Sanders         | 5,807                         | 6,926          | -1,119  | -16.2        |
| Sheridan        | 5,963                         | 7,814          | -1,851  | -23.7        |
| Silver Bow      | 46,355                        | 53,207         | -6,852  | -12.9        |
| Stillwater      | 5,158                         | 5,694          | -536  | -9.4         |
| Sweet Grass     | 2,928                         | 3,719          | -791  | -21.3        |
| Teton           | 5,976                         | 6,922          | -946  | -13.7        |
| Toole           | 5,482                         | 6,769          | -1,287  | -19.0        |
| Treasure        | 1,312                         | 1,499          | -187  | -12.5        |
| Valley          | 9,777                         | 15,181         | -5,404  | -35.6        |
| Wheatland       | 2,811                         | 3,286          | -475  | -14.5        |
| Wibaux          | 1,890                         | 2,161          | -271  | -12.5        |
| Yellowstone     | 37,907                        | 41,182         | -3,275  | -8.0         |

From the table it may be seen that two counties gained in population, namely, Deer Lodge by 434 and Cascade by 17. The other 54 counties lost, Valley as high as 35.6 per cent and Broadwater 35.4 per cent, or over one-third of their populations. The loss in population may be attributed to not only the citizens in the armed forces, but to the great number who have moved to the west coast and have entered war industry in the various cities there. A Montana picnic in the summer of 1944 of the Kaiser Shipyard workers in the Portland area had an attendance of over 8,000.

### **RESEARCH**

The research work and issuing of certified copies for proofs of birth reached an all time high in January, 1942, with 12,281 requests received at the office that month. At this time there were 12 persons employed in the Bureau of Vital Statistics and they were still unable to handle the volume of work. Additional help was rendered by a state-wide WPA project and by voluntary workers from the Junior Womens Club of Helena. The voluntary workers were discontinued in April and the WPA project closed June 30th. In July, 1942, the War Manpower Commission issued an order that workers in war industry need no longer submit proof of birth to obtain jobs but could do so on their own sworn statements. There has been a continued decline in the requests for certified copies of births from that group.

Dependents of men in the armed services must prove their relationship to draw soldier's allotments, and there has been an increase for these proofs. Certified copies are issued free to members of the armd services, consequently there has been a reduction in the fees received compared to the certified copies issued during the past year. Money received in 1942 was \$28,818.06 and in 1943, \$11,502.34, which was placed in the General Fund.

The personnel of the Bureau of Vital Statistics has been reduced to six in number, but may have to be increased again at the cessation of hostilities. An increase in the issuance of certified copies to the Veterans Administration is anticipated as the dependency proofs are requested.

### **INDEX REVISION**

The enormous increase in delayed birth records which have poured into the office during the past few years, has caused our index file to become terribly congested. It is necessary to revise the index from 1925 backward as far as delayed registration may go. The revised indexes for the years 1918-19-20 and 21 were completed January 1, 1944 and this work is being carried forward as time permits.

Table II following gives the births and deaths with their rates per 1,000 population; the infant deaths with their infant mortality rates per 1,000 live births, and the birth-death ratio, 1910 through 1943.

TABLE II

| Year | BIRTHS  |      | DEATHS |      | INFANT DEATHS |       | Births per 100 Deaths |
|------|---------|------|--------|------|---------------|-------|-----------------------|
|      | Number  | Rate | Number | Rate | Number        | Rate  |                       |
| 1910 | 6,124   | 16.2 | 3,996  | 10.6 | 714           | 116.6 | 153                   |
| 1911 | 7,542   | 19.0 | 4,006  | 10.1 | 717           | 95.1  | 188                   |
| 1912 | 8,133   | 19.6 | 4,397  | 9.9  | 660           | 81.2  | 185                   |
| 1913 | 8,682   | 20.1 | 5,098  | 11.6 | 812           | 93.5  | 170                   |
| 1914 | 9,969   | 22.1 | 5,048  | 10.8 | 834           | 83.7  | 198                   |
| 1915 | 11,132  | 23.8 | 5,242  | 10.8 | 816           | 73.3  | 212                   |
| 1916 | 11,300* | 23.2 | 5,483  | 11.9 | 970           | 85.8  | 206                   |
| 1917 | 11,600* | 23.0 | 6,421  | 13.1 | 1,090         | 94.0  | 181                   |
| 1918 | 11,800* | 22.6 | 8,985  | 17.2 | 1,027         | 87.0  | 131                   |
| 1919 | 12,017  | 22.3 | 5,786  | 10.7 | 962           | 80.1  | 208                   |
| 1920 | 11,862  | 21.6 | 5,289  | 9.6  | 862           | 72.7  | 224                   |
| 1921 | 12,127  | 22.2 | 4,693  | 8.6  | 805           | 66.4  | 258                   |
| 1922 | 11,060  | 20.3 | 5,106  | 9.3  | 763           | 69.0  | 217                   |
| 1923 | 10,524  | 19.3 | 4,914  | 9.0  | 748           | 71.1  | 214                   |
| 1924 | 10,283  | 18.9 | 4,991  | 9.1  | 683           | 66.4  | 206                   |
| 1925 | 10,302  | 19.0 | 5,103  | 9.6  | 726           | 70.5  | 202                   |
| 1926 | 10,008  | 18.5 | 5,375  | 10.0 | 757           | 75.6  | 186                   |
| 1927 | 9,875   | 18.3 | 5,185  | 9.9  | 651           | 65.9  | 190                   |
| 1928 | 10,072  | 18.7 | 5,812  | 10.7 | 612           | 60.8  | 173                   |
| 1929 | 10,080  | 18.7 | 5,748  | 10.7 | 640           | 63.5  | 175                   |
| 1930 | 10,004  | 18.6 | 5,435  | 10.1 | 569           | 57.0  | 184                   |
| 1931 | 9,642   | 17.9 | 5,278  | 9.8  | 578           | 59.9  | 183                   |
| 1932 | 9,114   | 16.8 | 5,291  | 9.8  | 460           | 50.5  | 172                   |
| 1933 | 9,950   | 16.5 | 5,217  | 9.6  | 451           | 50.4  | 172                   |
| 1934 | 9,954   | 18.3 | 5,616  | 10.3 | 529           | 53.1  | 177                   |
| 1935 | 10,050  | 18.4 | 6,281  | 11.5 | 594           | 59.2  | 160                   |
| 1936 | 10,448  | 19.1 | 6,246  | 11.4 | 587           | 56.2  | 167                   |
| 1937 | 10,230  | 18.6 | 6,125  | 11.1 | 513           | 50.2  | 167                   |
| 1938 | 10,657  | 19.2 | 5,673  | 10.2 | 487           | 45.7  | 188                   |
| 1939 | 10,931  | 19.6 | 5,894  | 10.6 | 531           | 48.6  | 185                   |
| 1940 | 11,468  | 20.5 | 5,722  | 10.2 | 527           | 46.0  | 200                   |
| 1941 | 11,513  | 20.5 | 5,627  | 10.0 | 427           | 37.1  | 205                   |
| 1942 | 11,588  | 20.7 | 5,491  | 9.8  | 397           | 34.3  | 211                   |
| 1943 | 11,258  | 23.3 | 5,585  | 11.5 | 440           | 39.1  | 201                   |

\*Estimated.

The highest birth rate through the years occurred in 1915 with 23.8 per 1,000 while 1943 was second with 23.3. The lowest rate, 16.5 per 1,000, showed on 1933, with second low, 16.8, in 1932.

The highest death rate of 17.2 per 1,000 occurred in the influenza epidemic year of 1918. The lowest rate of 8.6 was in 1921.

The birth-death ratio was highest in 1921, the low death year, while it was lowest in 1918, the high death year. For the last four years the ratio has been in excess of two births to one death.

The following Table III gives the births, deaths, infant and maternal deaths with their rate for 1942. The birth and death rates are based upon the population of the 1940 census. The maternal and infant deaths per 1,000 live births.

TABLE III

1942

| County        | Deaths | Rate | Births | Rate | Infant Deaths | Rate | Maternal Deaths | Rate |
|---------------|--------|------|--------|------|---------------|------|-----------------|------|
| Beaverhead    | 71     | 10.2 | 91     | 13.1 | —             | —    | —               | —    |
| Big Horn      | 74     | 7.1  | 211    | 20.3 | 11            | 52.1 | 1               | 4.7  |
| Blaine        | 74     | 7.7  | 172    | 18.0 | 10            | 58.1 | 1               | 5.8  |
| Broadwater    | 34     | 9.9  | 66     | 19.1 | 1             | 15.2 | —               | —    |
| Carbon        | 89     | 7.5  | 110    | 9.3  | 3             | 27.3 | —               | —    |
| Carter        | 21     | 6.4  | 31     | 9.5  | 1             | 32.3 | —               | —    |
| Cascade       | 491    | 11.7 | 1,178  | 28.0 | 54            | 45.8 | 3               | 2.5  |
| Chouteau      | 44     | 6.0  | 51     | 7.0  | 3             | 58.8 | —               | —    |
| Custer        | 109    | 7.7  | 274    | 26.3 | 11            | 40.1 | 1               | 3.6  |
| Daniels       | 32     | 7.0  | 83     | 18.2 | 4             | 48.2 | —               | —    |
| Dawson        | 83     | 9.6  | 222    | 25.8 | 4             | 18.0 | 1               | 4.5  |
| Deer Lodge    | 153    | 11.2 | 389    | 28.5 | 16            | 41.1 | —               | —    |
| Fallon        | 34     | 9.1  | 81     | 21.8 | 3             | 37.0 | —               | —    |
| Fergus        | 173    | 12.3 | 311    | 22.2 | 8             | 25.7 | 1               | 3.2  |
| Flathead      | 211    | 8.7  | 484    | 19.9 | 13            | 26.9 | —               | —    |
| Gallatin      | 136    | 7.4  | 344    | 18.8 | 10            | 29.1 | —               | —    |
| Garfield      | 22     | 8.3  | 50     | 18.9 | —             | —    | —               | —    |
| Glacier       | 90     | 10.0 | 270    | 29.9 | 12            | 44.4 | 1               | 3.7  |
| Golden Valley | 11     | 6.8  | 1      | —    | 1             | —    | —               | —    |
| Granite       | 27     | 7.9  | 15     | 4.4  | —             | —    | —               | —    |
| Hill          | 159    | 12.0 | 430    | 32.3 | 12            | 27.9 | —               | —    |
| Jefferson     | 38     | 8.1  | 70     | 15.0 | 1             | 14.2 | —               | —    |
| Judith Basin  | 13     | 3.6  | 1      | —    | —             | —    | —               | —    |
| Lake          | 131    | 9.7  | 222    | 16.5 | 12            | 54.1 | 1               | 4.5  |
| Lewis & Clark | 248    | 11.2 | 450    | 20.3 | 8             | 17.8 | —               | —    |
| Liberty       | 14     | 6.3  | 33     | 14.9 | 1             | 30.3 | —               | —    |
| Lincoln       | 69     | 8.8  | 122    | 15.5 | 4             | 32.8 | 1               | 8.8  |
| McCone        | 12     | 3.2  | 23     | 6.1  | —             | —    | —               | —    |
| Madison       | 36     | 4.9  | 41     | 5.6  | 3             | 73.8 | —               | —    |
| Meagher       | 12     | 5.4  | 15     | 6.7  | 2             | —    | —               | —    |
| Mineral       | 24     | 11.2 | 22     | 10.3 | —             | —    | —               | —    |
| Missoula      | 326    | 11.2 | 816    | 28.1 | 18            | 22.1 | 1               | 1.2  |
| Musselshell   | 71     | 12.4 | 86     | 15.0 | 8             | 93.0 | 1               | 11.6 |
| Park          | 106    | 9.2  | 224    | 19.4 | 8             | 35.7 | 1               | 4.5  |
| Petroleum     | 8      | 7.4  | 3      | 2.8  | —             | —    | —               | —    |
| Phillips      | 53     | 6.7  | 97     | 12.3 | 3             | 30.9 | 1               | 10.3 |
| Pondera       | 48     | 7.1  | 137    | 20.4 | 8             | 58.4 | —               | —    |
| Powder River  | 9      | 2.8  | 32     | 10.1 | —             | —    | —               | —    |
| Powell        | 65     | 10.6 | 118    | 19.2 | 5             | 42.4 | —               | —    |
| Prairie       | 17     | 7.1  | 44     | 18.3 | 1             | 22.7 | —               | —    |
| Ravalli       | 117    | 9.0  | 179    | 13.8 | 5             | 27.9 | 1               | 5.6  |
| Richland      | 67     | 6.6  | 255    | 25.0 | 6             | 23.5 | —               | —    |
| Roosevelt     | 64     | 6.5  | 237    | 24.2 | 9             | 37.8 | —               | —    |
| Rosebud       | 71     | 11.0 | 167    | 25.8 | 5             | 29.9 | 1               | 6.0  |
| Sanders       | 44     | 6.4  | 56     | 8.1  | 1             | 17.9 | —               | —    |
| Sheridan      | 52     | 6.7  | 115    | 14.7 | 5             | 43.5 | —               | —    |
| Silver Bow    | 676    | 12.7 | 1,195  | 22.5 | 25            | 20.9 | 5               | 4.2  |
| Stillwater    | 56     | 9.8  | 90     | 15.8 | 8             | 88.9 | —               | —    |
| Sweet Grass   | 43     | 11.6 | 60     | 16.1 | 3             | 50.0 | —               | —    |
| Teton         | 40     | 5.8  | 49     | 7.1  | 3             | 61.2 | —               | —    |
| Toole         | 49     | 7.2  | 116    | 17.1 | 6             | 51.7 | —               | —    |
| Treasure      | 8      | 5.3  | 10     | 6.7  | 2             | —    | —               | —    |
| Valley        | 83     | 5.6  | 253    | 16.7 | 10            | 39.5 | 1               | 4.0  |
| Wheatland     | 20     | 6.1  | 42     | 12.8 | —             | —    | —               | —    |
| Wibaux        | 19     | 8.8  | 17     | 7.9  | 1             | 58.8 | —               | —    |
| Yellowstone   | 426    | 10.3 | 1,327  | 32.2 | 49            | 36.9 | 4               | 3.0  |
| Total         | 5,491  | 9.8  | 11,588 | 20.7 | 397           | 34.3 | 27              | 2.3  |

Table IV following shows the deaths and births, their rate per 1,000 of population based on War Ration Book No. 4, and the Infant and Maternal deaths and their rates per 1,000 live births.

TABLE IV

1943

| County        | Deaths | Rate | Births | Rate | Infant Deaths | Rate  | Maternal Deaths | Rate |
|---------------|--------|------|--------|------|---------------|-------|-----------------|------|
| Beaverhead    | 64     | 11.5 | 67     | 12.1 | 3             | 44.8  | —               | —    |
| Big Horn      | 98     | 11.5 | 206    | 24.3 | 16            | 77.7  | 3               | 14.6 |
| Blaine        | 59     | 7.6  | 120    | 15.5 | 6             | 50.0  | —               | —    |
| Broadwater    | 40     | 18.0 | 45     | 20.2 | 2             | 44.4  | 1               | 22.2 |
| Carbon        | 146    | 15.9 | 93     | 10.1 | 3             | 32.3  | —               | —    |
| Carter        | 20     | 7.6  | 31     | 11.8 | 3             | 96.8  | —               | —    |
| Cascade       | 493    | 11.7 | 1,281  | 30.5 | 42            | 32.8  | 1               | 0.8  |
| Chouteau      | 50     | 9.0  | 47     | 8.5  | 1             | 31.3  | —               | —    |
| Custer        | 134    | 14.5 | 296    | 32.1 | 10            | 33.8  | 1               | 3.4  |
| Daniels       | 34     | 9.5  | 89     | 24.9 | 5             | 56.2  | —               | —    |
| Dawson        | 64     | 8.4  | 280    | 36.9 | 2             | 7.1   | —               | —    |
| Deer Lodge    | 128    | 9.1  | 358    | 25.5 | 14            | 39.1  | 1               | 2.8  |
| Fallon        | 31     | 10.1 | 94     | 30.7 | 5             | 53.2  | —               | —    |
| Fergus        | 145    | 12.6 | 316    | 27.5 | 15            | 47.5  | —               | —    |
| Flathead      | 196    | 10.1 | 409    | 21.1 | 16            | 39.1  | 1               | 2.4  |
| Gallatin      | 160    | 10.7 | 324    | 21.7 | 8             | 24.7  | 2               | 6.2  |
| Garfield      | 26     | 13.0 | 48     | 24.0 | 2             | 41.5  | —               | —    |
| Glacier       | 82     | 10.3 | 279    | 35.1 | 14            | 50.2  | —               | —    |
| Golden Valley | 8      | 7.0  | 4      | 3.5  | —             | —     | —               | —    |
| Granite       | 19     | 7.3  | 8      | 3.1  | —             | —     | —               | —    |
| Hill          | 142    | 12.8 | 400    | 36.0 | 11            | 27.5  | 3               | 7.5  |
| Jefferson     | 38     | 11.0 | 58     | 16.8 | 2             | 34.5  | —               | —    |
| Judith Basin  | 15     | 4.8  | 1      | —    | —             | —     | —               | —    |
| Lake          | 112    | 11.3 | 232    | 23.4 | 8             | 34.5  | —               | —    |
| Lewis & Clark | 270    | 14.9 | 467    | 25.8 | 12            | 25.7  | 1               | 2.1  |
| Liberty       | 14     | 8.4  | 39     | 23.3 | 1             | 25.6  | —               | —    |
| Lincoln       | 72     | 11.3 | 121    | 19.0 | 3             | 24.8  | —               | —    |
| McCone        | 15     | 5.9  | 21     | 8.2  | —             | —     | —               | —    |
| Madison       | 54     | 10.8 | 43     | 8.6  | 5             | 116.3 | —               | —    |
| Meagher       | 15     | 9.3  | 12     | 7.4  | —             | —     | —               | —    |
| Mineral       | 20     | 12.4 | 23     | 14.2 | 1             | 43.5  | —               | —    |
| Missoula      | 353    | 14.6 | 699    | 28.9 | 21            | 30.0  | 1               | 1.4  |
| Musselshell   | 49     | 10.7 | 89     | 19.5 | 4             | 44.9  | —               | —    |
| Park          | 113    | 11.9 | 195    | 20.6 | 9             | 46.2  | —               | —    |
| Petroleum     | 5      | 6.0  | 2      | 2.4  | —             | —     | —               | —    |
| Phillips      | 46     | 7.8  | 98     | 16.6 | 2             | 20.4  | —               | —    |
| Pondera       | 61     | 11.3 | 128    | 23.7 | 7             | 54.7  | —               | —    |
| Powder River  | 15     | 6.1  | 35     | 14.2 | 1             | 28.6  | —               | —    |
| Powell        | 74     | 13.1 | 94     | 16.6 | 1             | 10.6  | —               | —    |
| Prairie       | 16     | 7.7  | 154    | 26.0 | 1             | 18.5  | —               | —    |
| Ravalli       | 105    | 10.3 | 176    | 17.2 | 5             | 28.5  | —               | —    |
| Richland      | 81     | 9.3  | 279    | 31.9 | 14            | 50.2  | —               | —    |
| Roosevelt     | 97     | 11.2 | 244    | 28.1 | 15            | 61.5  | 1               | 4.1  |
| Rosebud       | 92     | 16.3 | 153    | 27.1 | 13            | 85.0  | —               | —    |
| Sanders       | 34     | 5.9  | 40     | 6.9  | 1             | 25.0  | —               | —    |
| Sheridan      | 50     | 8.4  | 120    | 20.1 | 6             | 50.0  | —               | —    |
| Silver Bow    | 692    | 14.9 | 1,115  | 24.1 | 60            | 53.8  | 1               | 0.9  |
| Stillwater    | 43     | 8.3  | 67     | 13.0 | 4             | 59.7  | —               | —    |
| Sweet Grass   | 31     | 10.6 | 54     | 18.4 | 2             | 37.0  | —               | —    |
| Teton         | 26     | 4.4  | 47     | 7.9  | —             | —     | 1               | 21.3 |
| Toole         | 5      | 9.3  | 118    | 21.5 | 10            | 84.7  | —               | —    |
| Treasure      | 4      | 3.0  | 5      | 3.8  | 1             | —     | —               | —    |
| Valley        | 93     | 9.5  | 260    | 26.6 | 7             | 26.9  | —               | —    |
| Wheatland     | 19     | 6.8  | 42     | 14.9 | 1             | 23.8  | —               | —    |
| Wibaux        | 6      | 3.2  | 4      | 2.1  | —             | —     | —               | —    |
| Yellowstone   | 437    | 11.5 | 1,328  | 35.0 | 45            | 33.9  | 3               | 2.3  |
| Total         | 5,585  | 11.5 | 11,258 | 23.3 | 440           | 39.1  | 21              | 1.9  |

The two preceding tables reveal that the counties with hospital facilities generally show higher birth and death rates. In 1943 Broadwater county had the highest death rate, followed by Carbon (the Bearcreek mine disaster here) with Lewis and Clark and Silver Bow tied for third. The highest birth rate occurred in Dawson county, followed by Hill, and Glacier. All figures are based on place of occurrence. Two hundred eighteen deaths in 1942 and 228 deaths in 1943 occurring in the State Hospital at Warm Springs and in the Tuberculosis Sanitarium at Galen are not included in the Deer Lodge county rates.

### BIRTHS

The total births recorded in Montana in 1942 were 11,588 with a rate of 20.7 per 1,000 of population. This was an increase of 75 births over 1941. The national birth rate for 1942 was 21.0. Montana was 0.3 per 1,000 under the national rate.

In 1943 there were 11,258 births recorded, a reduction of 330 under 1942. The rate was 23.3 per 1,000 population. This increase in rate is due to use of the estimated population on the basis of War Ration Book No. 4.

A summary of the birth statistics as to sex, color, plurality, and stillbirths for the years is as follows:

| Births       | 1942                        | Per Cent | 1943                        | Per Cent |
|--------------|-----------------------------|----------|-----------------------------|----------|
| Total        | 11,588                      | 100.0    | 11,258                      | 100.0    |
| Males        | 5,966                       | 51.5     | 5,705                       | 50.7     |
| Females      | 5,622                       | 48.5     | 5,553                       | 49.3     |
| Sex ratio    | 106 Males to<br>100 Females |          | 104 Males to<br>100 Females |          |
| White        | 10,764                      | 92.9     | 10,504                      | 93.3     |
| Indian       | 674                         | 5.8      | 620                         | 5.5      |
| Mexican      | 132                         | 1.1      | 98                          | 0.9      |
| Black        | 8                           | ....     | 9                           |          |
| Yellow       | 7                           | ....     | 17                          |          |
| Brown        | 3                           | ....     | 10                          |          |
| Illegitimate | 189                         |          | 145                         |          |
| Twins        | 93                          |          | 111                         |          |
| Triplets     | 2                           |          | .....                       |          |
| Stillbirths  | 205                         |          | 202                         |          |

## DEATHS

There were 5,491 deaths recorded in 1942 with a death rate of 9.8 per 1,000 of population. This was a drop of 136 under 1941. In comparison the national death rate in 1942 was 10.4 per 1,000. For 1943 there was an increase of 94 deaths over the preceding year to 5,585 with a death rate of 11.5.

Following are the death summaries for 1942-43 by sex, color and marital condition:

| <b>Deaths</b> | <b>1942</b> | <b>Per Cent</b> | <b>1943</b> | <b>Per Cent</b> |
|---------------|-------------|-----------------|-------------|-----------------|
| Total         | 5,491       | 100.0           | 5,585       | 100.0           |
| Male          | 3,597       | 65.5            | 3,680       | 65.9            |
| Female        | 1,894       | 34.5            | 1,905       | 34.1            |
| Single        | 1,544       | 28.1            | 1,612       | 28.9            |
| Married       | 2,343       | 42.7            | 2,313       | 41.4            |
| Widowed       | 1,298       | 23.6            | 1,326       | 23.7            |
| Divorced      | 204         | 3.7             | 208         | 3.7             |
| Unknown       | 102         | 1.9             | 126         | 2.3             |
| White         | 5,188       | 94.5            | 5,250       | 94.0            |
| Indian        | 247         | 4.5             | 280         | 5.0             |
| Mexican       | 18          | 0.3             | 18          | 0.3             |
| Black         | 26          | 0.5             | 22          | 0.4             |
| Yellow        | 11          | 0.2             | 13          | 0.2             |
| Brown         | 1           | ....            | 2           | ....            |

Central registration of marriages, divorces and adoptions became effective July 1, 1943. The tabulation of the last six months of 1943 for these events by counties is shown in Table V.

TABLE V

| County          | Marriages | Divorces | Adoptions |
|-----------------|-----------|----------|-----------|
| Beaverhead      | 77        | 10       | 2         |
| Big Horn        | 79        | 13       | ...       |
| Blaine          | 18        | 7        | ...       |
| Broadwater      | 10        | 21       | ...       |
| Carbon          | 46        | 17       | ...       |
| Carter          | 5         | 2        | ...       |
| Cascade         | 419       | 107      | 37        |
| Chouteau        | 41        | 5        | ...       |
| Custer          | 87        | 20       | 11        |
| Daniels         | 9         | 2        | ...       |
| Dawson          | 60        | 6        | 2         |
| Deer Lodge      | 56        | 30       | 5         |
| Fallon          | 34        | ...      | ...       |
| Fergus          | 60        | 19       | 8         |
| Flathead        | 81        | 44       | 1         |
| Gallatin        | 99        | 10       | 4         |
| Garfield        | 2         | ...      | ...       |
| Glacier         | 43        | 11       | ...       |
| Golden Valley   | 1         | ...      | ...       |
| Granite         | 12        | 4        | ...       |
| Hill            | 63        | 18       | 4         |
| Jefferson       | 19        | ...      | ...       |
| Judith Basin    | 13        | 3        | ...       |
| Lake            | 40        | 8        | 4         |
| Lewis and Clark | 158       | 76       | 63        |
| Liberty         | 6         | 2        | ...       |
| Lincoln         | 48        | 8        | 1         |
| McCone          | 7         | ...      | ...       |
| Madison         | 10        | 9        | ...       |
| Meagher         | 28        | 1        | 2         |
| Mineral         | 107       | 4        | ...       |
| Missoula        | 285       | 61       | 25        |
| Musselshell     | 27        | 3        | 2         |
| Park            | 54        | 14       | 1         |
| Petroleum       | 3         | ...      | ...       |
| Phillips        | 22        | 10       | 3         |
| Pondera         | 17        | 22       | ...       |
| Powder River    | 76        | ...      | 1         |
| Powell          | 33        | 8        | 8         |
| Prairie         | 7         | ...      | ...       |
| Ravalli         | 53        | 15       | 4         |
| Richland        | 130       | 8        | 3         |
| Roosevelt       | 56        | 15       | 2         |
| Rosebud         | 19        | 9        | ...       |
| Sanders         | 51        | 5        | ...       |
| Sheridan        | 52        | 13       | ...       |
| Silver Bow      | 337       | 126      | 18        |
| Stillwater      | 34        | 6        | ...       |
| Sweet Grass     | 12        | 2        | ...       |
| Teton           | 28        | 1        | 4         |
| Toole           | 31        | 8        | 4         |
| Treasure        | 1         | ...      | ...       |
| Valley          | 62        | 7        | ...       |
| Wheatland       | 1         | 3        | ...       |
| Wibaux          | 60        | 1        | ...       |
| Yellowstone     | 314       | 87       | 15        |
| Total           | 3,503     | 881      | 237       |

Table V reveals a total of 3,503 marriages performed during the final six months of 1943. This is a rate of 14.5 per 1,000 of population. There were 881 divorces or annulments of marriage reported, giving a marriage-divorce ratio of 4 to 1, or 25 per cent. New birth certificates were substituted in 237 cases of adoptions.

## INFANT MORTALITY

The infant deaths, those under one year of age, amounted to 397 in 1942. This was a decrease of 130 under those of 1941. The infant mortality rate was 34.3 per 1,000 live births and was the lowest in history. For comparison, the infant death rate in 1910 was 116.6 per 1,000. The 1942 rate was only 29 per cent of that of 32 years ago.

In 1943 the infant deaths increased by 43 over 1942 and the rate rose slightly to 39.1 per 1,000 live births. The national rate was 40.4 in 1942.

## MATERNAL MORTALITY

There were 27 deaths due to childbirth in 1942. The rate was 2.3 per 1,000 live births. In 1943 there were only 21 puerperal deaths and the rate was 1.9 per 1,000. This latter rate tied 1941 which was the lowest in history. The 1910 maternal death rate was 10.1. In 33 years this rate has been reduced over 80 per cent. The national maternal mortality for 1942 was 2.6 per 1,000.

## COMMUNICABLE DISEASES

(All rates per 100,000 of population)

**Typhoid Fever.** No deaths from this disease were reported in 1942, while four deaths occurred in 1943 with a death rate of 0.8.

**Smallpox** caused no deaths in either 1942 or 1943.

**Epidemic Meningitis** claimed 7 lives in 1942 and 6 in 1943, the rates were 1.2 for each year.

**Scarlet Fever** claimed three victims each of the two years.

**Whooping Cough** caused 12 deaths in 1942 with a rate of 2.1, and 18 deaths in 1943 with a rate of 3.7.

**Diphtheria** claimed five lives each year, the rate was 1.0.

**Erysipelas** caused two deaths in 1942 and one in 1943.

**Tuberculosis** deaths amounted to 195 in 1943, the rate was 34.8. In 1943 they increased slightly to 199 and the rate was 41.1. This latter is just under the average rate for the United States, 41.9. New cases reported showed 386, while the cases per death were 1.94 compared to the national average of 2.10. The Indians contributed 59 of the deaths or 29.6 per cent with a death rate of 311.0 compared to the 28.7 for the whites. Silver Bow County alone accounted for 54 tuberculosis deaths or 27 per cent of the total.

**Dysentery** caused three deaths in 1942 and 10 in 1943. The rates were 0.5 and 2.1, respectively.

**Syphilis** took a toll of 56 in 1942 with a rate of 10.0, while in 1943 they dropped to 44 with a rate of 9.1.

**Influenza** went from 31 deaths and a rate of 5.5 in 1942 to 67 deaths in 1943 with a rate of 13.8.

**Measles** caused no deaths in 1942, but caused eight in 1943.

**Poliomyelitis** caused no deaths in 1942, but increased to five in 1943.

**Lethargic Encephalitis** took eight lives in 1942 and decreased to four in 1943.

**Rocky Mountain Spotted Fever** caused 13 deaths in 1942 and nine in 1943, their respective rates were 2.3 and 1.9.

The total communicable disease deaths for 1942 were 360 with a rate of 64.3, the lowest in history, while in 1943 they increased to 398 with a rate of 82.2.

#### PRINCIPAL CAUSES OF DEATH

| Order | Cause           | 1942  | Rate  | Order | 1943  | Rate  |
|-------|-----------------|-------|-------|-------|-------|-------|
| 1.    | Heart           | 1,466 | 361.8 | 1     | 1,522 | 314.5 |
| 2.    | Cancer          | 644   | 115.0 | 3     | 604   | 124.8 |
| 3.    | Apoplexy        | 539   | 96.2  | 4     | 477   | 98.6  |
| 4.    | Accidents total | 480   | 85.5  | 2     | 619   | 127.9 |
| 5.    | Nephritis       | 321   | 57.6  | 5     | 320   | 66.1  |
| 6.    | Pneumonia       | 255   | 45.5  | 6     | 261   | 53.9  |
| 7.    | Tuberculosis    | 195   | 34.8  | 7     | 199   | 41.1  |
| 8.    | Auto            | 109   | 19.5  | 8     | 100   | 20.7  |
| 9.    | Suicides        | 97    | 17.0  | 10    | 67    | 13.8  |
| 10.   | Diabetes        | 68    | 12.1  | 9     | 93    | 19.2  |
| Total |                 | 4,174 |       |       | 4,262 |       |

The ten causes of death constitute 76 per cent or over three-fourths of all the deaths occurring in the state. Disease of the heart far outstrip any other condition as the number one cause of death both years. Cancer was second in 1942 and third in 1943. The cancer death rate has continued to increase through the years. In 1910 the rate was 41.5 compared to 1943 with 124.8, a 200 per cent increase.

Cancer deaths by primary site for the two years were:

| Site                  | 1942   |      | 1943   |      |
|-----------------------|--------|------|--------|------|
|                       | Number | Rate | Number | Rate |
| Buccal Cavity         | 16     | 2.9  | 14     | 2.9  |
| Digestive Tract       | 295    | 52.7 | 288    | 59.5 |
| Respiratory           | 43     | 7.7  | 45     | 9.3  |
| Uterus                | 48     | 8.6  | 32     | 6.6  |
| Other female genitals | 12     | 2.1  | 15     | 3.1  |
| Breast                | 73     | 13.0 | 48     | 9.9  |
| Male genitals         | 57     | 10.2 | 61     | 12.6 |
| Urinary tracts        | 34     | 6.1  | 31     | 6.4  |
| Skin                  | 19     | 3.4  | 19     | 3.9  |
| Brain                 | 3      | 0.5  | 1      | 0.2  |
| Other organs          | 44     | 7.9  | 50     | 10.3 |

Cancer of the digestive tract constitutes 46 per cent of the total, while those primary in the breast are second.

Apoplexy was third cause of death in 1942 and fourth in 1943. Accidents were fourth in 1942 and increased to second in 1943. Specific accidents causing the most deaths in both years were motor vehicles, falls, mines and quarries, drowning, burns and air transportation. An unusual increase in mine accidents was due to the Bearcreek coal mine disaster in 1943. Army Air Corps training crashes caused heavy increase in air transport accidents in 1943.

Nephritis, pneumonia, tuberculosis and motor vehicles were 5, 6, 7, and 8, respectively for the two years.

Suicides showed a marked decrease in 1943 under 1942 and dropped from ninth to tenth place, interchanging with diabetes which increased from 68 to 93 deaths. There were 21 homicides listed in 1942 and 15 in 1943. The rate was 3.7 and 3.1.

Respectfully submitted,

L. L. BENEPE,

State Registrar.

**DIVISION OF MATERNAL AND CHILD HEALTH**

**Edythe Hershey, M. D., Director.**

**Thomas M. Leonard, M. D., Ass't Director (Resigned Aug. 1, 1944)**

**Maud A. Brown, M. A., Director, Health Education (On Leave July, 1943 - May, 1944).**

**K. Elizabeth Anderson, M. A., Field Consultant in Health Education.**

**Florence Whipple, R. N., State Supervisor, Public Health Nursing.**

**Wava Dixon, R. N., Advisory Nurse.**

**Mary Van Vactor, R. N., Advisory Nurse (Resigned Jan. 1, 1944).**

**Helen Murphy, R. N., MCH Advisory Nurse (On leave as of July, 1944).**

**Stenographers: (As of December, 1944).**

**Senior: Helena K. Brander, Maxine Conver, Eileen Murphy.**

**Intermediate: Patricia Sahinen, Lois O'Connell, Margaret Sandbo.**

**Junior: Irene Merritt.**

The Division of Maternal and Child Health\* is responsible for the promotion of a statewide program to safeguard and improve the health of mothers and their children. The extension of this program has been made possible through funds available under Title V of the Social Security Act which is administered by the Children's Bureau, United States Department of Labor. These funds are used to match the state appropriations and monies expended locally for maternal and child health. There is also a supplementary allocation of federal funds which is provided to meet special needs and which does not require matching funds from the state.

The biennial report is herewith submitted for the period December, 1942, to December, 1944.

**Medical Advisory Committee**

The Maternal and Child Health Committee of the Montana State Medical Association serves as the technical advisory committee to the Division. It cooperates with the Division in the following activities:

**1. Maternal and Infant Mortality and Stillbirth Studies:** These studies were initiated in 1940 and a five-year report (1940-1944) will be published in 1945. The data were collected from questionnaires submitted by the physicians who file the death or stillbirth certificates.

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\*The Division of Child Welfare of the State Board of Health was created in 1917 by act of the Fifteenth Legislative Assembly for the promotion of Maternal and Child Health. In 1937, under the Public Welfare Act, a Division of Child Welfare was established in the Department of Public Welfare for protection of dependent and neglected children and children in danger of becoming delinquent. As the functions of the two divisions are quite distinct, the division in the State Board of Health is now known as the Division of Maternal and Child Health to avoid confusion and to define more clearly the activities of the Division.

The Montana maternal mortality rate for 1943 was 19 maternal deaths per 10,000 live births, as compared with 22 in 1942. The rate for the United States in 1942 was 26. The figures for 1944 are not complete, but certificates filed to date indicate a further reduction of maternal deaths. It is significant to note that in 1940 the rate was 33 and since 1940 the low rates of 18 to 22 have been maintained. The irreducible minimum is probably about 15 maternal deaths per 10,000 live births and it is believed Montana can soon reach this level. The use of the sulpha drug has reduced deaths from infection and more extensive use of blood plasma will reduce deaths from hemorrhage. Prenatal care has been more complete and the mothers are seeking care earlier in pregnancy thus reducing deaths from toxemia.

The infant death rate has also been lowered in recent years, but in 1942 (latest U. S. rates available) there were 12 states with infant mortality rates lower than that of Montana including Conn., Ill., Mass., N. Y., N. J., Wash., and Ore. The infant mortality rate in Montana in 1943 was 39 infant deaths as compared with 34 in 1942. The figures to date in 1944 indicate a slight reduction with some improvement in the neonatal death rate (infants under one month of age). Efforts to reduce infant mortality rates must be directed toward problems related to prenatal and natal factors influencing the condition of the infant at birth and care of the newborn, especially prematurely born infants.

The stillborn rate has been reduced but it is questionable whether all stillbirths are reported. According to 1943 laws of Montana a stillbirth has been defined as a birth after 20 weeks of gestation which is not a live birth. Prior to this a stillbirth was defined as one of 24 weeks of gestation. Apparently some physicians have not been aware of this change regarding reporting of stillbirths.

**2. Premature Care Program:** This program was fully described in the previous biennial report. Twenty-five incubators were built by this Division and purchased at slightly below cost by or for hospital use. These incubators have now been in use sufficiently long to demonstrate their efficiency. A maternal and child health nursing consultant with post-graduate training in care of the premature infant demonstrated the use of the incubator and instructed hospital personnel in nursing techniques. This consultant also accepted calls through physicians or hospitals at the time a premature baby was born so that teaching might be carried out directly and the infant given advantage of specialized nursing care. This service has proved most satisfactory but has not been used as extensively or as effectively as possible, since there is a tendency to place the call for this service after the baby is 24 or 48 hours old and the condition is poor, instead of having consultant present at birth or as soon thereafter as possible. Unfortunately the consultant has not been available since July, 1944, so this service has not been available. Experience in the program indicates an urgent need for better training of professional personnel in the care of the premature infant. Followup care through public health nurses after the baby is discharged from the hospital is essential. While the mortality rate of infants weighing 1,000 grams or less at birth is practically 100 per cent, the percent-

age of those weighing 1,500 to 2,500 grams (3 to 5 lbs) whose lives may be saved is in direct proportion to the birth weight provided facilities for care are available and expert care is given.

A demonstration program for premature care was established through the Cascade City-County Health Department with a public health nurse having post-graduate training in premature care in charge of the program. The two hospitals in Great Falls, the Montana Deaconess Hospital and the Columbus Hospital, participate. The Deaconess Hospital established a premature nursery with facilities for the care of six infants. These hospitals have also studied and improved techniques in the newborn nursery. While the number of cases is too small to date to be of statistical significance, it is evident that more of these babies have been saved since the demonstration was inaugurated and that in the past year the infant mortality rate in Cascade County has made a significant drop. It is hoped that similar services may be developed in other centers.

**3. Post Graduate Education for Physicians:** At the suggestion of the maternal and child health committee it was decided to continue refresher courses in obstetrics and pediatrics. It was felt that because the doctors were busier than ever before, very few of them would be able to attend medical meetings and postgraduate courses out of state. Accordingly a refresher course in obstetrics was held in the spring of 1944. The course was conducted by Dr. John Parks, chief of the department of obstetrics and gynecology at Gallinger Municipal Hospital, Washington, D. C. This course was conducted in a manner similar to those of the past. Two meetings were held at four centers: Butte, Great Falls, Billings, and Glendive, and one meeting in Helena. An afternoon meeting followed by dinner and an evening meeting comprised each course. Meetings were very well attended and the physicians' comments indicated that the lectures were satisfactory.

Many physicians from out of the state came in to the Montana meetings. These included men from Cody, Wyo.; Powell, Wyo.; Williston, N. D.; Dickinson, N. D.; and Richardson, N. D. There was a total attendance at all of the lectures of 142 doctors, with 35 at Butte, 45 at Great Falls, 35 at Billings, 13 at Glendive, and 14 at Helena. In addition, some of the meetings were attended by nurses especially interested in obstetrics.

**4. Maternity Hospital Licensing:** Rules and regulations for licensing maternity hospitals were published in 1942 in accordance with a law enacted by the Montana State Legislature in 1941. Inspections of medical, nursing and sanitary facilities have been made in practically every hospital receiving maternity patients and in maternity homes. Fire inspections are made through the state fire marshal. Many small maternity homes have closed since the law was enacted where more adequate hospital facilities are available in the community. It was decided to give every institution ample opportunity to meet requirements before issuing licenses. With the resignation of the assistant director and the absence of the MCH nursing consultant, this program has been impeded as personnel has not been available for final inspections.

It has been more than gratifying to note the cooperation of hospitals. In spite of wartime limitations many improvements have been made; i.e., removal of fire hazards, better nursery facilities, improvement of obstetric and pediatric techniques, provisions for making plasma available without delay, and improvement of sanitary conditions, especially plumbing.

General standards have been materially improved even though there has been a shortage of nursing personnel. As yet consultation is not required in most hospitals before major obstetric procedures are instituted and more careful study should be made by hospital staffs of maternal mortality and early neonatal deaths and stillbirths. There is also a need for more education regarding breast feeding and more interest on the part of the physician, as well as for training of nursing personnel, if fewer babies are to be discharged from hospitals on formula rather than on breast feeding. This is an important but little recognized problem of hospital care.

In 1942 (latest U. S. figures available) 89.2 per cent of mothers were delivered by physicians in hospitals, 9.5 per cent by physicians in homes and only 1.3 per cent without medical attendance at time of confinement. Cases without medical care at confinement are primarily among Indians and in outlying rural areas.

Data have been collected on hospital facilities for maternity care throughout the state and this report will be published in more detail.

**5. Premarital and Prenatal Examinations:** Thirty-three states require premarital examinations and thirty states require examinations of blood for syphilis for prenatal cases. Montana and Washington are the only two states in the northwestern area that have not passed such laws. These laws have done much toward furthering education in regard to venereal disease, as well as detecting actually infected individuals and having them placed under adequate treatment, thus preventing the spread of infection and practically eliminating congenital syphilis. Many physicians do not do routine blood examinations for syphilis on all pregnant women although there has been a notable increase in these examinations during the past few years. The committee, therefore, recommended that the Montana State Medical Association sponsor legislation for premarital and prenatal examinations and this recommendation was adopted by the House of Delegates in Butte in July, 1944. The legislation will be in accord with model law which has been formulated by the American Social Hygiene Association.

The Montana Parent-Teacher Association, Montana Federation of Women's Clubs, Montana Federation of Business and Professional Women and the Montana Public Health Association have also endorsed this legislation.

**6. Need for Plasma:** In view of need for more extensive use of blood plasma in prevention of shock and treatment of hemorrhage in obstetric cases, the committee recommended that the State Board of Health, through the Hygienic Laboratory, study the possibility of development

of a central blood bank and preparation of plasma because of the difficulties in many areas of the state in obtaining and maintaining adequate supplies, as well as the expense involved. The State Medical Association endorsed the study of such a project.

**7. The Emergency Maternity and Infant Care Program:** Since the initiation of this program in April, 1943, the committee has worked very closely with the director of the division in the formulation of policies governing the administration of this program and the Montana State Medical Association has endorsed the program. This is an emergency program for the duration and six months thereafter as provided by the Congress of the United States.

The EMIC Program provides maternity care for wives and care of infants of enlisted men in the U. S. armed forces in the 4th - 7th pay grades and Army aviation cadets.\* The benefits allow medical and hospital care of the wives throughout the period of pregnancy, including the six weeks post-partum care, and medical and hospital care as needed by infants during first year of life, including health supervision and immunization against whooping cough, diphtheria and smallpox. The program is administered by the Division through the U. S. Children's Bureau and general policies are uniform in all states. Payment is made directly to the physician or hospital rendering the service. There is no financial investigation or question of residency, since this is a benefit allowed to men in the armed forces and paid for entirely by federal funds.

Since May, 1943, over 3,100 cases have been authorized for care under the program in Montana, with a total obligation of \$253,125.00. The funds are allotted each month in accordance with amounts authorized for payment on all applications approved. The physicians and hospitals submit reports on cases when claims are filed. These reports will serve for basis of study of maternal care as recommended by the Advisory Committee five years ago. Practically every physician who practices obstetrics has participated in the program. Every hospital meeting standards has participated.

The hospitals are paid on a reimbursable cost per diem basis as shown by cost accounting statements submitted by hospitals which have been paid \$500,000 under the program. The services of a certified public accountant have been made available to hospitals to assist in the preparation of statements and to interpret the policy of payment on reimbursable cost basis. This has resulted in a further study of hospital charges in relation to costs and it is believed that from this study there will evolve a more equitable rate of payment. The hospital facilities provided under the program are for semi-private or ward care and neither the patient nor her family are allowed to make any payment to either the hospital or the physician for care. The State Board of Health assumes full financial responsibility for care when application is approved and application must be for both medical and hospital care.

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\*From July, 1943 - October, 1943, eligibility was extended to those in 1st - 3rd pay grades when evidence was given of financial need.

This program has been recognized by the War Department as an integral part of the war effort. The service has been appreciated by the public and especially by the men in the armed services who have been given assurance that in their absence their wives and infants will have the best possible care. With few exceptions the wife is limited to the allotment of \$50.00 a month and this would not have been adequate to provide for medical and hospital care during pregnancy. Unquestionably this program has saved the lives of some of these babies and has made possible adequate care for every pregnant woman.

The entire program was new to all concerned. Despite the implications of a medical care program administered through a federal agency, the medical profession of the state has cooperated and every effort has been made to administer this program in accord with the highest standards of the medical profession.

**8. Well-Child Conference:** These conferences are conducted by local physicians assisted by public health nurses under the auspices of the Division through which physicians are remunerated for their services. The conferences provide regular health supervision for infants and pre-school children. Those registered are given complete physical examinations, vaccinated for smallpox and immunized against diphtheria. Whooping cough vaccination and tuberculin testing are included in some conferences. During the biennium, with the shortage of physicians in local areas and the limitation of public health nursing personnel, this program has been curtailed. Conferences have been conducted in Cascade county and Gallatin county through the local health department, and in Ravalli, Valley, Chouteau, Teton and Yellowstone counties through participation of local physicians.

**9. Summer Round-up:** The Director of the Division serves as state chairman for the Summer Round-up project of the Montana Parent-Teacher Association. This project is carried on through local units of the Parent-Teacher Association and every effort is made to educate parents regarding their responsibilities for seeing that their children who enter the first grade of school in the fall are physically fit, have remediable defects corrected before they start school, and are protected against smallpox and diphtheria. It is the general plan to have these children examined by their family physicians and arrangements made for examinations of children whose parents cannot provide this care. In counties having a program for health supervision of pre-school children through well-child conferences, the Summer Round-up project is integrated with this program, as a child six years old will be physically fit only if his health has been protected through infancy and in the early pre-school years. Summer Round-ups are conducted by the full-time county health officers in Gallatin, Cascade, Missoula and Lewis and Clark counties.

In 1943 there were 89 units registered, 68 of which carried the project through; 1,138 children were examined, 322 by the family physician and 129 by the family dentist. Practically one-fourth were referred for medical attention and approximately 40 per cent for dental care.

Over one-half of these children had not been vaccinated against smallpox and 44 per cent had not been protected against diphtheria. Approximately 50 per cent of these were subsequently protected against smallpox and over 60 per cent against diphtheria. 252 were also given the tuberculin test.

The reports for 1944 have not yet been compiled.

**10. Silver Nitrate:** Silver Nitrate ampules have been furnished to hospitals, physicians, and nurses for prophylactic treatment of the eyes of the newborn babies; during the biennium, 12,818 ampules were distributed.

**11. Prenatal Letters:** The series of nine prenatal letters are sent each month to expectant mothers at the request of the attending physician, public health nurse or the mother. Many physicians have requested that this service be extended to their patients. Since December, 1942, 5,579 mothers have received prenatal letters and the number of requests during the past year have materially increased over the preceding year.

For a number of years the United States Children's Bureau pamphlet "Infant Care" was mailed with each birth notification. This service was discontinued in July, 1942, because franking privileges were no longer allowed. However, since that date copies of this pamphlet have been sent to hospitals so that every mother with a new born baby may be given a copy before she leaves the hospital. The pamphlet is distributed through physicians and public health nurses for mothers who are delivered at home.

**12. Literature Distributed:** Pamphlets distributed through the Division are sent only on request. An attempt is made to make available authentic material on the various aspects of maternal and child health and related health problems. These pamphlets cover maternal, infant and child care, nutrition, social hygiene, mental hygiene, personal hygiene, public health, hearing and vision conservation, and dental health. In addition to the literature distributed through the Health Education Service during the past year, limited clerical facilities have not been adequate to tabulate amount of literature distributed.

**13. Cooperation with Other Agencies:** It has not been possible to develop the plan for follow-up of the Montana Conference on Child Health and Protection held in 1941 because of wartime conditions. A number of the County Children's Councils have carried on, but the State Advisory Committee has not functioned. It is the plan to resume these activities as soon as feasible.

The services of the Division are made available to all agencies and professional and lay groups. Professional meetings attended included the Montana State Medical Association, Montana Public Health Association, Tuberculosis Association, Parent-Teacher Association, Business and Professional Women's Club, Montana Hospital Association, and conferences on vocational rehabilitation at the Montana State College. There was active participation on the programs of these meetings.

The Director attended regional meetings called by the U. S. Children's Bureau in San Francisco, Salt Lake (incident to the EMIC program) and the MCH Director's Meeting in Washington, D. C., and served on special Children's Bureau Committee which met in Washington regarding pediatric services. She served as National Health Chairman for the Business and Professional Women's Club. At the 1944 meeting of the American Public Health Association she was appointed chairman of the Maternal and Child Health Section.

The Assistant Director attended the 1943 session of A.P.H.A. Conference of the Children's Bureau in Washington, D. C.

**14. Administrative Duties:** These duties included formulation of plans and budgets for approval of the United States Children's Bureau through which funds are administered, preparation of all reports for the Division as required by the United States Secretary of Labor for the Children's Bureau, supervision of all services under the jurisdiction of the Division and routine correspondence, as well as preparation and approval of material to use through the Division. Consultation Service is rendered to the Division through the regional medical consultant of the Children's Bureau. Since the inauguration of the EMIC Program the time of the Director has been largely given to that program. There has been a rapid and extensive turnover in the stenographic force and this has necessitated training of new personnel with a resulting loss of efficiency during the training period. The program has also been handicapped by limited professional personnel with resignation of the Assistant Director in August and absence of the MCH nursing consultant since July. Procedures and routines have now been established for the EMIC program so that it should be possible to give more attention to the basic maternal and child health activities. The EMIC program, however, has made it possible to focus attention on the needs and through the direct service, it has been possible to interpret more intelligently the facilities and to re-direct the educational program to meet the needs.

Because of crowded conditions in the State Board of Health Building, the Board of Examiners made space available in the Capitol Building for the offices of the Division of Maternal and Child Health.

#### **HEALTH EDUCATION SERVICE**

The staff of the Health Education Service consists of a director and a field consultant. The director was absent on leave from July, 1943, to May, 1944, the consultant's time during this period having been divided between office and field.

The purpose of this service is informational and advisory and the service is carried on by means of (a) group meetings and personal consultation service, (b) specially prepared "Health-in-Education" leaflets, (c) literature (pamphlets and books) and films circulated through a lending library, (d) free distribution material, and (e) collaboration with the State Department of Education.

No distinction is recognized between public health and personal health, nor between physical, mental, and emotional health. Health is the optimal quality of the total living experience of the individual, and efforts to further it through education are the consideration of every division of the Health Department, the School, and all other community groups. The Health Education Service is planned for the whole child in his total twenty-four hour environment.

These services have been carried on largely through the medium of the public school system, through the public health nurses and the teachers for two reasons: first, because educability decreases rapidly with age; second, because the public school, from nursery school through college, is the established medium of public education.

Health Education is a bi-professional enterprise. Responsibility for soundness of procedure rests with the health professions; for effectiveness of instruction, with the educational. The interest and cooperation of the school administrators, both local and state, have provided this established pathway through the classrooms and parent organizations to the family unit.

Adult education is an officially recognized function of the public schools. Parent education in health is approached (a) through the child as a member of the family unit; (b) through individual conferences of parents with the public health nurse in the home, and with principals and teachers at school; (c) through various adult groups, particularly Parent-Teacher Associations.

**Consultation Service** is rendered (1) by staff members in their offices, (2) by field consultant and occasionally by others of the Division to members of local health departments and schools. During the biennium 194 such office consultations were held, (3) by correspondence. Special effort is being made to make every request for information or materials the occasion for individual help.

**Group Addresses and Participation in Conferences and Committees** constitute means of reaching a large number of interested adults.

The Teachers' Institutes constitute the most direct means of contact with the teacher-in-service. These Institutes are held annually by the State Supervisors of Public Instruction in every county in the state. The field consultant in Health Education is a regular member of the State Supervisors' group, and participates in the Institutes, presenting Health on the same basis as other fundamental subjects. The block organization is used for rural schools, and health is vitalized in a growing integration in both rural and urban schools. During the two institute seasons of 1943 and 1944, and the sections of the Montana State Teachers' Associations of those years, the total teacher attendance was approximately 4,500.

Forty-seven other meetings have been addressed or participated in during the biennium.

The director of the M.C.H. Division is called upon frequently to meet with state groups, in consideration with education problems in health. She is a member of the State Executive Board of the P.T.A. The field consultant is president of the State Physical Education Health and Recreation Association. She is also one of the Vice Presidents of the North District of the American Association for Health, Physical and Recreation. The director of the Health Education Service represents the N.W. states on the committee on coordination of health and education agencies of the National School Health Association. All three are members of the State Nutrition Council.

**Field Appraisals** are made by the field consultant and occasionally by the director of the Health Education Service. These visits are on request of the County or City Superintendents of Schools, and require from one day to two weeks according to the size of the school or the school system. The purpose is the appraisal of existing conditions and program and conference with the administrator and teachers over plans for adjusting or enlarging the program to achieve an actually functional health program. During the biennium 139 school visits were made.

**The Teacher in Training** is only indirectly the concern of the State Department, through consultation with the teacher-training faculties. Except in special cases, classroom teaching is not done in colleges or schools by state staffs. Increasing rapport is being developed between the Health Education Service and those concerned in the health programs of the colleges. The field consultant has done direct teaching by such special invitation during the past year of classes in four of the state colleges and two high schools.

The state epidemiologist has given talks to high schools and colleges on problems of social hygiene. The appreciation is great and the demand greatly exceeds the amount of time that can be given by him to these lectures.

**Health-in-Education Leaflets** are prepared for the purpose of bridging the gap between the actual classroom situation and the printed literature of the subject. They are sent on request to teachers, school administrators, and public health nurses. They are about equally divided between subject matter and procedure and are keyed to local needs.

During the absence of the director during most of the last school year, they were discontinued. Seven have been issued during the present school year; ten during the biennium, to a request mailing list of 1,315.

#### **Free Distribution Material**

##### **A. Routine records, working forms and charts:**

The primary aim of this service through the schools is to assist them to develop an actually functional program, one that improves the health of the pupils. This means, of course, a health-promoting life at home and out in the community as well as during the hours at school. The school health education program must, therefore, embody all essentials of optimal twenty-four hour living. A scope this comprehensive involves of necessity considerable detail. In planning then, after including all essentials, it is important to exclude all non-essen-

tials, and finally to simplify and coordinate the handling of these essentials in the ordinary school situation.

To bring this irreducible minimum of health education to every classroom, a kit of materials has been prepared which, if used as a unit, should enable any teacher, however underprivileged as to training or situation, to incorporate the essentials of healthful living in her everyday program. With the accompanying directions and suggestions, they are helpful with no medical or nursing assistance, although they are much more effective with such assistance. Planned for normal times, they are proving useful in helping the community conserve the time of the professional workers in the field of health.

These materials include:

School Health Appraisal Form  
Cumulative Health Record  
Nurse-Teacher Work Sheet  
Classroom Growth Record  
Snellen Eye Chart  
Communicable Disease Information for School Chart  
Special Bulletin No. 43 of the Montana State Board of Health  
Dental Referral Cards  
Daily Health Record (Home)  
Daily Health Record (School)

A sample kit was mailed early in the fall of 1943 to every Superintendent of Schools in the State, reminding them of the availability of these materials. Through repeated reminders by mail, through personal explanations at the county institutes, through other contacts in the course of consultation service, and through the cooperation of the Public Health nurses, the use of these materials has grown steadily. During the first weeks of the present school year (September and October of 1944) 1,568 teachers have been supplied with partial or complete sets for continuing or beginning the more complete health education program. Effort is being concentrated on securing the use of the whole set as a working unit.

Briefly stated, the several items of this working unit serve the following purposes:

1. The School Health Appraisal Form is for the teacher's (or administrator's) personal convenience in evaluating his health program as to its soundness and completeness, and planning for its improvement. It is the keystone of the plan, setting a generalized pattern of essentials which any functioning program should meet, but leaving adaptation to the specific situation to the individual teacher.

2. The Cumulative Health Record gives the continuous health picture of the child and carries the continuous record of his health

progress for his entire school life, with the pertinent facts of his early health history and family environment. Conditions are summarized on this record at the end of each year, and it is used for recording the findings of the medical or dental examinations made during the year. Sufficient data concerning mental and emotional characteristics are included to constitute a working picture of the child as a growing and developing individual.

The growing use of this Cumulative Health Record is the most gratifying development of the period. Not only is this very complete record being used widely in situations having nursing or medical service, but an increasing number are being requested for use by educational staffs in absence of professional health service. A growing interest in the whole child is evidenced by the 9,515 new records supplied for the current school year. In a state of small schools, this shows a very gratifyingly widespread use.

3. The Nurse-Teacher Work Sheet is a convenient instrument for facilitating cooperation of the nurse and teacher in securing specific correctness and general health improvement of each individual pupil. It is most effectively used in conjunction with the Cumulative Health Record.

4. The Snellen Eye Chart with careful directions for its use is now being supplied to schools for teachers' use. In view of the present shortage of nursing service, teachers are being encouraged to use this method as a preliminary check to find children with visual defects.

5. Dental Referral Cards for each child are supplied to schools which wish to cooperate with the local dentists in stimulating interest of the parents in regular supervision of dental health by the family dentist for prevention, as well as repairative dentistry.

6. The Classroom Growth Record carries directions for the taking and interpretation of measurements of growth in weight and height as one important index of health status.

7. A chart carrying "Communicable Disease Information for Schools" is supplied to every classroom in the state and a bulletin, "Control of Communicable Disease Among School Children," furnishes more complete information.

8. In the interest of health habit formation, two forms for checking health habits, one for home use and one for the classroom, are furnished for cooperative use. These have been particularly welcomed by the parents.

#### B. Literature for free distribution:

Pamphlets and posters on problems primarily concerned with or including the child of school age is distributed by the Health Education Service either free or on loan.

**The Lending Library** consists of: (a) Books and pamphlets covering the topics involved in the coordination of the fields of education and

health. (b) Plastic models in dental health and nutrition are loaned to schools and adult groups. A life-size model of a human trunk is popular with high schools. (c) Films are circulated through the State Department of Visual Education and through the public health nurses. Twenty-four health films are owned by the State Board of Health and 51 by the Visual Aids Division of the State Department of Public Instruction.

**Dental Health Education:** Since the discontinuance of the specific Dental Health Service, education in dental hygiene has been re-absorbed into the general health education program. Dental health is included as one important phase of a unit program.

**The Public Health Nurses** are the most important of all collaborating agencies. Close touch is maintained through field cooperation, office conferences and through their annual institutes, together with Public Health Nursing Notes. Every effort is being made to help the schools to assume the responsibility rightfully theirs, regardless of emergency, that the time and energy of the nurses may be conserved for work peculiarly their own. It is believed that the educational value of this participation will, by that time, be so evident that it will persist after the supply of nursing and medical service is restored to normal.

**Cooperation with the State Department of Public Instruction:** The State Departments of Health and Education have developed an actually integrated program. In addition to the Teachers' Institute this cooperation has included: (a) The Course of Study and the Course of Study Units. (b) The authorization of the standards of this Health Appraisal Form. The joint sponsorship of the two departments with forewords by the heads of each gives confidence to the teacher in the soundness and feasibility of the recommended program of health essentials. (c) The annual conference of state superintendents includes health among problems of administration considered. Representatives from the Health Department are always in attendance.

## PUBLIC HEALTH NURSING

**1. Administration:** The State Board of Health has responsibility for the supervision of all public health nurses in Montana in accordance with the Public Health Law. The State Supervisor of Public Nursing, through the Division of Maternal and Child Health, the Division of Rural Health work and the Division of Crippled Children, serves as supervisor of public health nurses within the state.

She is assisted by one advisory nurse serving in a general supervisory capacity, one maternal and child health nursing consultant, and three orthopedic advisory nurses in the Division of Crippled Children, each of the latter serving one-third of the state giving advisory service in those counties where there are public health nurses and direct service in all other counties in the supervision and development of adequate care of crippled children.

In three of the city-county health units (Cascade, Gallatin and Missoula) local public health nursing supervisors give supervisory service to the public health nurses employed by the unit.

Public health nurses working in the counties are under the administrative direction of the local health officer for that part of the program under his jurisdiction as health officer and are responsible to the agency employing them. They are responsible to local or state supervisory staffs for the quality and quantity of their professional activities and make a report of these activities each month to the State Board of Health.

The State Supervisor of Public Health Nursing, at the request of the Montana State Nurses Association, has served for six months as acting chairman of the State Procurement and Assignment Committee for Montana under the War Manpower Commission. This committee has activated the classifying of graduate nurses by 15 district procurement and assignment committees and has established a master state file of all nurses classified as to their availability for military service, or as to the essentiality of the position they are now holding. To date 999 Montana nurses have been classified. All quotas for nurses for the armed services, as set up for Montana by the National Red Cross Nursing Service, have been more than filled.

**2. In-Service Education:** As a wartime substitute for the annually held Western Branch Meeting of the American Public Health Association, the National American Public Health Association in 1943 sent a team of recognized leaders in public health to various western states including Montana. This meeting was held for two days in Bozeman. Thirty-four public health nurses were in attendance. These nurses remained for an additional one-day institute to discuss nursing problems. In 1944 a different team, but under the same circumstances, included Montana in its itinerary and thirty-two nurses attended the three-day meeting.

The public health nurses also attended a two-day institute on orthopedic nursing conducted by Miss Jessie Stevenson of the National Organization for Public Health Nursing.

Two meetings of advisory nurses and local public health nursing supervisors have been held in Helena during this biennium to discuss nursing problems.

Public health nurses were also in attendance at the annual meeting of the Montana Tuberculosis Association in 1943 and 1944. They also had the opportunity of attending the two annual business meetings of the Montana State Nurses' Association. Staff education is carried on through the visits of the state staff in the field or through conferences in the state office. Fifteen nurses, before beginning public health nursing work in the state, have spent one or two days in Helena meeting the state staff and learning about the Public Health Program for the state, as administered by the Montana State Board of Health.

The state supervisor has edited seven issued of Public Health Nursing Notes which are sent to public health nurses, advisory committees and members of the Board of Health. In addition pamphlets and articles of use in maintaining a high quality of service are sent to all public health nurses in the state.

**3. Post-Graduate Training:** Through Social Security funds granted the State of Montana through the United States Public Health Service, fifteen Montana nurses have been sent to recognized public health nursing courses for one quarter of study in public health nursing. With aid granted directly to the universities through the funds made possible by the Bailey-Bolten Act, these nurses have been able to remain at the university for a longer period before returning to Montana to begin public health nursing work. This has added materially in obtaining well-qualified public health nurses for Montana positions.

**4. Field Services of the State Staff:** During 1943-44 the state supervisor and her advisory nurse made 148 visits to thirty-seven of the fifty-six counties in Montana to assist public health nurses with their programs, to promote interest in and arrange for public health nursing service, and to give direct service where no public health nurse was employed.

**5. Local Public Health Nursing Service:** Recruitment of well qualified public health nurses has become still more difficult with the demand for nurses for the military taking precedence over civilian positions. With the general unrest of wartime public health nurses have moved to other localities to accept higher-paid positions or have married and left to be with husbands in the service. Consequently, many counties have been without public health nursing service for months before replacements could be secured. In counties where there are local public health nursing supervisors to provide daily supervision, graduate nurses without public health nursing training have been used successfully as war-emergency nurses.

**6. Tabulation of Service by Counties:** In this biennium thirty-six public health nurses in Montana have resigned, eleven to enter the armed services, fourteen because of marriage and seven to accept public health nursing positions elsewhere. Twenty public health nurses and four emergency war nurses have been found to replace those who resigned.

| County   | 1943    | 1944    |   |
|----------|---------|---------|---|
| Big Horn | 6 mos.  | .....   | One county nurse  |
|          | 6 mos.  | .....   | One school nurse, generalized program in School Dist. No. 17. |
| Carter   | 12 mos. | 12 mos. | One county nurse  |

| County        | 1943     | 1944      |   |
|---------------|----------|-----------|---|
| Cascade       | 12 mos.  | 12 mos.   | City-County Health Unit<br>Supervisor             |
|               | 12 mos.  | 12 mos.   | Supervisor, premature care<br>demonstration       |
|               | 22 mos.  | 21 mos.   | Two county nurses                                 |
|               | 36 mos.  | 34 mos.   | Three school nurses, generalized<br>(Great Falls) |
|               | 8 mos.   | 12 mos.   | Emergency war nurse                               |
|               | .....    | 2 mos.    | One Tbc. nurse                                    |
| Chouteau      | 12 mos.  | 10 mos.   | One county nurse                                  |
| Custer        | 4 mos.   | .....     | One county nurse                                  |
| Dawson        | 3 mos.   | 2.5 mos.  | One county nurse                                  |
| Deer Lodge    | 9 mos.   | 9 mos.    | One school nurse (Anaconda)                       |
| Fergus        | 5.5 mos. | 10.5 mos. | One county nurse                                  |
|               | 12 mos.  | 12 mos.   | One school nurse, generalized<br>(Lewistown)      |
| Gallatin      | 12 mos.  | 6 mos.    | City-County Health Unit<br>Supervisor             |
|               | 26 mos.  | 17 mos.   | Three county nurses                               |
|               | 2 mos.   | 12 mos.   | Emergency war nurse                               |
| Hill          | 12 mos.  | 12 mos.   | One county nurse                                  |
|               | 3 mos    | .....     | One school nurse, generalized<br>(Havre)          |
| Jefferson     | 8 mos.   | .....     | One county nurse                                  |
| Lake          | 11 mos.  | 4 mos.    | One county nurse                                  |
| Lewis & Clark | 12 mos.  | 8 mos.    | City-County Health Unit<br>One county nurse       |
|               | 9 mos.   | 9 mos.    | One school nurse ( Helena)                        |
| Lincoln       | 9 mos.   | 9 mos.    | One part-time school nurse<br>(Libby)             |
| McCone        | 1 mo.    | .....     | One county nurse                                  |
| Missoula      | 10 mos.  | 12 mos.   | City-County Health Unit<br>Supervisor             |
|               | 32 mos.  | 25 mos.   | Three county nurses                               |
|               | 12 mos.  | 12 mos.   | One Metropolitan Life Ins. Co.<br>nurse           |

| County            | 1943    | 1944    |   |
|-------------------|---------|---------|---|
| Park .....        | 12 mos. | 11 mos. | One school nurse, generalized<br>(Livingston)               |
| Phillips .....    | 7 mos.  | .....   | One county nurse  |
| Pondera .....     | 12 mos. | 12 mos. | One county nurse  |
| Powell .....      | 12 mos. | 12 mos. | One school nurse, generalized                               |
| Ravalli .....     | 12 mos. | 12 mos. | One county nurse  |
| Roosevelt .....   | 8 mos.  | .....   | One county nurse  |
| Sanders .....     | 12 mos. | 5 mos.  | One county nurse  |
| Stillwater .....  | 4 mos.  | .....   | One county nurse  |
| Silver Bow .....  | 13 mos. | 20 mos. | Two county nurses   |
|                   | 18 mos. | 18 mos. | Two school nurses   |
|                   | 24 mos. | 21 mos. | Two Metropolitan Life Ins. Co.<br>nurses                    |
|                   | 12 mos. | 12 mos. | One Tuberculosis nurse                                      |
| Teton .....       | 12 mos. | 11 mos. | One county nurse  |
| Toole .....       | 12 mos. | .....   | One county nurse  |
| Valley .....      | 12 mos. | 12 mos. | One county nurse  |
| Wheatland .....   | 12 mos. | 7 mos.  | One county nurse  |
| Yellowstone ..... | 3 mos.  | .....   | Supervisor  |
|                   | 19 mos. | 4 mos.  | Two county nurses   |
|                   | 23 mos. | 15 mos. | Two school nurses, generalized<br>(Billings)                |
|                   | .....   | 4 mos.  | One part-time infant and pre-<br>school public health nurse |

In 1943, 58 nurses served 556 months in 30 counties and in 1944, 59 nurses served 465 months in 23 counties, a decrease of 9 per cent in nursing time over the previous biennium. As a result the statistical report which follows will show a decline except in a few instances over the previous biennium for 1941-42.

7. **Statistical Report of Services:** The report which follows is for a 24-month period, November and December, 1942 (not included in last biennium) 12 months 1943, and 10 months, 1944. The figures for the work done in November and December 1944 were not available when this report was assembled.

8. **Maternity Service:** The public health nurse offers her assistance to the physician for those mothers who are to be delivered at home and she makes the necessary visits beforehand to insure adequate facilities for a safe delivery.

A major portion of the public health nurses' time in the maternity program has been given to wives and babies of service men under the Emergency Maternity and Infant Care Program. This consisted of visiting during the prenatal period to assist the mother with her plans and to aid her in obtaining the diet and care her physician has recommended, going into the home as shortly after mother's and baby's return from the hospital as possible to assist with the care of the new baby by giving a demonstration bath and instruction in the care necessary for her and the baby's health. The hospitals have assisted greatly by notifying the nurses of the date the mothers and babies leave the hospital. Follow-up visits are made frequently to give further help and instruction.

|  |       |
|--|-------|
| Patients admitted to maternity service ..... | 2,316 |
| Prenatal visits .....                        | 4,294 |
| Nursing service for home deliveries .....    | 91    |
| Post partum visits .....                     | 6,969 |

9. **Infant Health Supervision:** Visits are made to babies more frequently during the first few weeks of life than during succeeding months as the infant mortality rate is greater in the early months and mothers request assistance more frequently during this period. Through a birth index file the nurse has information as to babies born in her area so that she may have a planned program for health supervision. Home and office visits to infants under one year of age totalled 15,857, a decrease of 18 per cent over the 1941-42 period; 37 per cent of these visits were made to infants under one month of age.

10. **Preschool Health Supervision:** Nursing visits are made to preschool children to help the parents to realize the need for regular medical and dental supervision; for protecting those not already protected against smallpox, diphtheria, and whooping cough; to help in planning the child's diet, habit training, and general development. Home and office visits made to preschool children totalled 17,606.

11. **School Health Service:** Visits are made to the homes of school children to interpret to the parents the physical, mental, and emotional needs of the child as evidenced by his behavior and physical inspection at school. The public health nurse is vitally concerned in each child's adjustment to life outside of the home and helps to promote those factors in both the home and school which will develop a strong, healthy child.

|   |        |
|---|--------|
| Examinations by physicians .....                | 13,790 |
| Examinations by physicians with parents present | 1,692  |
| Nurses' inspection of school children .....     | 33,077 |
| Home and office visits to school children ..... | 51,120 |

**12. Communicable Disease Control:** The public health nurse visits the homes of children ill with a communicable disease reported to her by the health officer, the school authorities, or others, to demonstrate care of the child and prevention of spread of the disease. She works very closely with the health officer. Because of increased incidence of the communicable diseases, (influenza, measles, and scarlet fever) a great deal of nursing time was spent in visits to care for and help to control the spread of the disease. Health officers and private physicians have cooperated in counties not having public health nursing service to provide facilities for group vaccination and immunization for children of school and preschool age and infants. Members of the state staff have gone in to assist with the program in those counties not having public health nurses. Local school authorities and boards of county commissioners and women's clubs have aided and supported this program.

|   |        |
|---|--------|
| Inspection of school children for communicable disease....      | 52,938 |
| Home visits for communicable disease .....                      | 47,594 |
| Vaccination for smallpox .....                                  | 13,440 |
| Immunization against diphtheria .....                           | 16,756 |
| (33% under 5 years of age, 7% under 1 year of age)              |        |
| Vaccinations for whooping cough (50% under 2 yrs. of age) 3,327 |        |
| Venereal disease visits .....                                   | 264    |

**13. Control of Tuberculosis:** During 1943-44 a tuberculosis case-finding program has been carried out in 51 of the 56 counties in Montana by the Montana Tuberculosis Association and in counties having public health nursing service assisted by the public health nurses. The tests are given to high school youth, the eighth grade and sometimes to lower grade children, as well as to members of the families of those who are positive. X-rays are taken of all positive reactors and the expense for this service, excluding the local public health nurse's time, is met by the Montana Tuberculosis Association through its annual Christmas Seal sale. Public health nurses carry on a year-round program of supervision through home and office visits to contact or diagnosed cases. In addition, the names of 512 men rejected by Selective Service have been referred back to the public health nurse for follow-up nursing supervision.

|   |        |
|---|--------|
| Field nursing visits for tuberculosis control ..... | 9,025  |
| Office nursing visits .....                         | 7,425  |
| Tuberculin tests .....                              | 27,659 |
| X-rays taken .....                                  | 4,916  |
| Admissions to Sanatoria .....                       | 222    |

14. **Morbidity Service:** In Montana bedside nursing care to patients ill in their homes is offered by nurses employed by the Metropolitan Life Insurance Company to their policyholders in Butte, Great Falls, Missoula and Billings.

Other public health nurses are unable to give continued bedside nursing service to patients ill in their homes, but do visit to demonstrate care that is needed to some member of the family.

Visits for nursing care in the home ..... 6,850

15. **Crippled Children's Services:** Public health nurses, under the supervision of the orthopedic advisory nurses, find children crippled or physically handicapped and arrange for diagnosis and treatment of those unable to assume this expense under the Crippled Children's Services. They assist at the orthopedic clinics held in each area twice a year.

Home visits to crippled children ..... 5,780

For the work of the orthopedic advisory nurses, reference is made to the report of the Crippled Children's Services.

**REPORT OF THE DIVISION OF SANITARY ENGINEERING**

Biennial Period Ending November 30, 1944

**H. B. Foote, C. E. Director.****W. M. Cobleigh, E. M., A. M., Dean (Emeritus) School of Engineering, State College, Bozeman, Consulting Engineer.****C. W. Brinck, M. S., Chemical Engineer and Ass't Director.**  
(On leave—in Sanitary Corps, U. S. Army.)**Milton Brown, B. S., Bacteriologist.****Henry Garber, Ass't Engineer.****Clara Grainer, Stenographer.**

To: W. F. Cogswell, M. D., Executive Officer, Montana State Board of Health:

I have the honor to report to you the work of the Division of Sanitary Engineering of the State Board of Health for the biennial period ending November 30, 1944.

**Change in Name of Division**

By appropriate action the State Board of Health, on April 15, 1944, changed the name of this Division from that of Water and Sewage to that of Sanitary Engineering. This was deemed desirable because of the expansion of the field of work and the more clearly defined field of sanitary engineering as now recognized.

The principle work of the Division of Sanitary Engineering is comprised of the following activities.

1. Bacteriological and chemical examination of water samples of both public and private supplies.
2. Field inspections of public and private water supplies.
3. Field inspections of sewage disposal systems.
4. Field inspections of stream pollution problems.
5. Field inspections of public swimming pools.
6. Inspection of plans for public water supplies.
7. Inspection of plans for public buildings.
8. Inspection of plans for public sewage disposal systems and for waste disposal from industrial plants.
9. Inspection of plans for public swimming pools.

### Laboratory Testing of Water

The testing of samples of water makes up the bulk of the laboratory work. A check upon the condition and operation of public water supplies is obtained by frequent routine bacteriological tests. In order that each supply will receive proper attention at regular intervals, a calendar has been prepared which lists for each week the cities to which sampling equipment is to be sent. By this calendar, plants giving the water relatively complete treatment, such as filtration and softening, are sampled twice a month. Plants in which chlorination is the only treatment are sampled once a month. Other plants are sampled from four to six times a year, the frequency depending upon the character of the supply or more particularly the source of the water. Those ground waters which appear to be the most constant in quality are sampled less frequently. We have in Montana several public water supplies which are given no treatment although taken from surface sources. These are watched carefully and the sampling is consequently somewhat more frequent.

The State Board of Health owns a considerable number of insulated shipping cases and bottles which are used for the collection and shipment of samples. These are sent by express, properly sealed, to the collector who, after the collection of samples, packs them with ice, seals and returns them to the laboratory by express, charges collect. The collector is usually the local water superintendent or the health officer, who is carefully instructed in the matter. For the sealing, a self-locking tin seal is used on which is stamped the name of the State Board of Health, and a number for identification. The standard sample bottle used is of 125 ml. (approximately 4.4 oz.) capacity, with a  $\frac{3}{4}$ -inch mouth, and provided with a bakelite screw cap  $\frac{3}{4}$ -inch long. A thin gasket is placed in each cap.

This system fits very satisfactorily into our extensive territory where the visiting of supplies is attended by considerable expense. The local collectors cooperate excellently so that little delay due to their failure to collect is experienced.

In the testing of water from the many private supplies, samples are transmitted by mail in mailing tubes, a stock of which is kept on hand. In the laboratory such samples are tested only for bacteria of the coliform group, although they are also observed as to their physical quality, turbidity in comparison with silica standards being measured and recorded.

In the case of the Indian and National Park Service work, as well as other government work, the samples have been sent to the laboratory under Government frank or bill of lading.

There are now in Montana 114 cities, towns, and other communities and seven state-owned institutions with public water systems. Of the total of 147 water supplies furnishing water to these systems, 90 are from ground sources and 57 from surface sources. The population served in these communities and state institutions is approximately

303,500, or 55 per cent of the total population of 554,136 as shown by the 1940 census for the State of Montana.

Through an arrangement with the State College, Bozeman, the data obtained from chemical analyses of water samples have been sent to them for interpretation from the standpoint of the suitability of such waters for irrigation, in cases where such information is requested. Inasmuch as the same analytical data can be used for interpretation from the standpoint of domestic use and irrigation use, this arrangement eliminates much duplication of analyses. The same may be said of arrangements with Dr. Butler, of the Livestock Sanitary Board, relative to the suitability of waters for stock watering purposes.

In any bacterial testing of water, the laboratory follows the standard methods of the U. S. Public Health Service. In the chemical analyses, either these standards or those of the Association of Official Agricultural Chemists are followed. Our laboratories are well provided with both equipment and supplies. Since the first of April, 1938, we have been using in the coliform routine, the Brilliant Green Bile confirmatory media in place of Endo's, all lactose broth tubes showing any percentage of gas being inoculated into the confirmatory medium.

The following tabulation shows the amount of laboratory work done during the past twenty-four months:

|   | Bacteriological | Chemical | Per Cent of Total |
|---|-----------------|----------|-------------------|
| Samples from Public Water Supplies .....  | 8,429           | 53       | 76.7              |
| Samples from Private Water Supplies.....  | 819             | 432*     | 11.3              |
| Samples from Tourist Camp Water Supplies  | 38              | 2        | 0.4               |
| Samples from School Water Supplies .....  | 230             | 16       | 2.2               |
| Samples from United States Government ... | 685             | 20       | 6.4               |
| Samples from Miscellaneous Sources .....  | 236             | 101      | 3.0               |
| <br>Total .....                           | <br>10,437      | <br>624  | <br>100.0         |
| <br>GRAND TOTAL .....                     | <br>11,061      |          |                   |

\*Of these 129 were examined for presence of arsenic in connection with the problems at Roberts, Montana.

### Field Activities

The field work is done by railway, bus and automobile travel. It is the intention and endeavor of this Division to see each public water supply once a year and the larger ones—especially the purification plants—oftener. Frequently it is necessary to return to a given city to make follow-up investigations or to investigate special conditions where they may arise. When investigating these public water supplies, the city or water company officials are interviewed and the trips and inspections are made in their company. The owners and operators of public water supplies in Montana are aware of the necessity of maintaining proper sanitary conditions and excellent cooperation is usually found. In this way the maximum benefits to be derived from

inspections are obtained. For the most part, too, the men in charge of the public water supplies in this State are awake to the modern trends in water treatment and water quality.

When in a given city, private water supplies, swimming pools, and ice fields are visited and inspected in addition to other public structures, including the municipal sewer system.

### **Public Water Supply Improvements**

There has been little in the way of improvements in public water supply systems in Montana during the past two years. Such as have been made have been in treatment and such work as has been necessary to keep the water flowing.

A well for augmenting the existing water supply is now under construction at Red Lodge, Montana. It is hoped also that this well will yield water of better physical quality than that which is obtained from the near-by creek.

At Shelby a concrete reservoir of one million gallon capacity has been constructed. At Great Falls a new concrete reservoir is under construction. When completed this will add over four million gallon's storage capacity to the city's water system. Both of these reservoirs are of the so called pre-stressed type, are covered and are definitely an advantage not only in increasing storage but in providing protection to the water.

At Townsend a new liquid chlorine plant was installed on the water supply on October 24, 1944. On the Basin Creek supply in Butte a chlorine plant was installed in April, 1944.

The water supply for the State Girls' Vocational School in the valley near Helena is taken from a large dug well located adjacent to Prickley Pear Creek. Early in 1944 this water showed evidences of contamination as indicated by positive tests obtained for bacteria of the coliform group. As a consequence, an emergency hypochlorite plant was installed in February, which operated until April 15 when a permanent installation was made.

For the most part, we feel that at this time the water systems are being maintained in a generally satisfactory condition although due to the present restriction in the obtaining of materials, defects will accumulate requiring greater activity when materials are more easily obtained.

There are several communities which are in serious need of public water supply systems to eliminate hazardous situations due to the use of shallow well water subject to contamination from cesspools and privy vaults. At Fairfield a test well is under construction and plans are being perfected for the construction of a public water supply system. Plans are prepared for a common water supply system at Highwood and this doubtless will be constructed as soon as materials and labor are available. The community at Drummond has had under considera-

tion the possibilities of a public water supply system but no definite action has as yet been taken. It will be necessary for them to incorporate as a town or to form an improvement district under county commissioners if they are to secure financial assistance from any governmental agency or are to build the system as a public institution.

### **Emergency Disinfection of Water Supplies**

Scarcely a year passes but what some occasion arises for the emergency disinfection of drinking water. During the past two years three such cases have been brought to our attention and disinfection has been installed within a few hours thereafter.

At Polson a liquid chlorine plant was installed as a temporary safeguard on November 26, 1943, during a period of repair and construction on the city water system.

At Townsend a State Board of Health chlorine plant was installed on the city water March 8. This has been followed, as stated above, by a permanent installation. At the State Girl's Vocational School, hypochlorination was instituted on February 7 to care for the situation until a permanent installation could be made, which was completed on April 15.

### **Improvements in Sewer Systems**

As in the case of water supplies, there has been little activity in the matter of extending present systems or of building new ones. The treating plant at Laurel has stood incomplete because the Federal War Production Board would not allocate materials for completion. The city has applied for and obtained new priorities and has ordered the necessary material which has been promised by the manufacturers. It is expected that this plant will be in operation by the spring of 1945. In anticipation of this fact, sewers are being laid in various unsewered parts of the city. Such extension of sewers was not approved by the State Board of Health until treatment was assured.

At Heath in Fergus County a septic tank and chlorination system has been installed to care for sewage from an industrial establishment.

There is need for increased sewerage facilities in practically all the larger communities in the state and a serious need of such facilities in smaller communities, which are at present without them. Drummond, Ekalaka, Cascade, Circle, Harlem, Thompson Falls, Hot Springs, Jordan, Lodge Grass, Bainville, Chester, Dutton, Stevensville, Sheridan and Hobson are some of these.

### **Industrial Wastes and Stream Pollution**

During the past two years extensive studies have been made of various situations arising especially because of industrial wastes. In this work we have had the invaluable aid of Dean W. M. Cobleigh of Bozeman, who has served as our consultant for many years.

On the Yellowstone River the Northern Pacific Railway Company has under construction extensive enlargement of its shops at Livingston. A new sewer has been laid to the Yellowstone River on which will be built a large open retention basin for the trapping of oily wastes especially. Into this new sewer will flow the effluent from a septic tank which, for several years, has served a residential section lying in the north part of the city.

At Billings further work has been done especially with petroleum refinery wastes. Methods for control of oil and other refinery wastes are under consideration. During November, 1944, special attention was given to beet sugar factory wastes.

Mention has been made of the sewage treating plant at Laurel. The oil refinery at that place has built a larger oil trap, which is expected to add a margin of safety to the structures which are now in use for the protection of the stream. At Laurel also the Northern Pacific Railway Company is planning new and improved methods of caring for wastes from the so-called "dope" plant, which recovers oil and grease from used packings of car journals.

On the Milk River at Chinook the U & I Sugar Company still discharges certain wastes to West Fork of the Milk River. This has been the subject of intensive studies in previous years. A check up of the structures used to impound certain wastes from this factory has shown them to be effective, for the most part. The factory management is following recommendations previously made by the State Board of Health.

Some studies and observations were made on Clark's Fork of the Columbia River at and below Missoula during the summer of 1944. This was upon complaint of a group of farmers living below the city. No conclusions regarding the situation have, as yet, been reached, although certain obvious sources of contamination are present. More studies of this situation are contemplated as are studies of other stream pollution problems, which, as the years go by, assume greater significance in the state.

### Drainage Problems

Some sections of Montana received more rainfall during the summer of 1944 than in any like period since records have been kept. This fact gave rise to conditions and troubles due to high ground waters more aggravated than commonly encountered. Special investigations were made at Forsyth, in a section of Butte outside the city limits, and in the village of Lodge Grass in Big Horn County.

We have had, in the course of years, many complaints of wet basements and other troubles due to high ground waters and have concluded that there are three main sources which may give rise to such conditions. The first of these is the introduction of water to the ground as through irrigation ditches and the flooding of lands in irrigation. Another frequent source of trouble is the infiltration of natural ground water which migrates from higher elevations to lower areas

which may not give trouble until they are augmented by rain or melting snow. A third cause for surface floods is excessive rains or melting snow, possibly in connection with the obstruction of natural run-off.

The most common complaint is of flooded basements in homes and business establishments but other troubles are found in difficulty in securing well water of good sanitary quality and in the disposal of sewage especially in rural areas.

The only remedy for high ground water, which is due to irrigation, is found in adequate drainage which is widespread in scope. Many miles of drainage ditches have been constructed in irrigated areas principally for the saving of the land from excessive water logging and alkali nuisance. There are situations in small communities, however, which have not been relieved by such drainage. The remedy we see for wet basements and allied troubles due to the natural migration of ground waters may likewise be alleviated by the proper drainage either by ditching or by the laying of the drain tile. This will probably be a public activity since the benefits derived are usually of a public nature.

The flooding of streams may, at times, involve serious public health problems such as has occurred on the Milk River and did occur on the lower Yellowstone in the vicinity of Miles City last spring. There are local situations which may be due strictly to local circumstances but it is not uncommon for us to receive complaints because of local flooding especially in the early spring when accumulated snows of the winter are melting.

At Miles City during March, 1944, an ice jam formed in the Yellowstone River in the vicinity of Miles City. At the peak of the flood the river water was 14 feet above the normal water surface of the stream at the municipal water supply intake. A bomber was furnished by the U. S. Army at the request of Governor Ford and dropped several bombs on the ice jam. Within a very short time after the bombing the river subsided. The flood affected the people living in the low land north of the city and adjacent to the river. Many shallow wells were found there which had been heavily contaminated. Basements were flooded and much property damage resulted. The work of the Sanitary Engineering Division consisted of advising people about water supply and sewage disposal until normal conditions could be resumed.

After the Miles City flood had subsided, 50 water samples were collected from flooded wells for bacterial tests. These wells range from shallow dug wells and driven sand points 10 feet deep to drilled wells 125 feet deep. The condition of well equipment and appurtenances varied from bad to good. Some wells were disinfected and others were not, before samples were collected.

Nothing of a statistical nature can be derived from the results of these tests except that two-thirds of the deep wells and three-fourths of the shallow wells tested for coliform organisms were positive.

Only those wells whose outlets were in kitchens above flood levels apparently were free from contamination, indicating that the contamination doubtless entered the wells through faulty top construction.

### Arsenic Contamination of Drinking Water

An unusual occurrence was brought to our attention in July 1944, concerning Mr. and Mrs. Armitage, who died at Roberts in Carbon County and it has been divulged that these people died from drinking water containing excessive amounts of arsenic. Mrs. Armitage died before the presence of the arsenic was suspected, but Mr. Armitage's death occurred after some work had been done on the examination of the water samples. The first sample of water received by us showed arsenic to be present in lethal amounts and regardless of the source of the arsenic and the method by which it reached the water, it seems evident that these two people died from this cause.

The village of Roberts, having a population of about three hundred, is located in the valley of Rock Creek approximately fourteen miles down the valley north from Red Lodge. There is no common water supply system here nor is there a common sewerage system. The householders use wells or springs from which their water is drawn and sewage is disposed of either through cesspools or by the use of privies. The water is obtained from wells dug, for the most part, in the gravel about 8 to 10 feet deep. These wells are poorly constructed for the most part, but have doubtlessly been used for many years. The well of the Armitages' is no exception, although it has a six-inch iron casing which is a somewhat better type of construction than many of the other wells. Seven samples have been examined from this well, all of which have shown an unusually large amount of arsenic. In all, 127 samples of water from the wells in Roberts have been examined for arsenic. None of the neighboring wells have shown arsenic in amounts comparable to that in the Armitage well water. It appears, therefore, that whatever may be the source of arsenic in the first well, the arsenic had not traveled to the other wells by the time we had made our last examinations. In all, 145 samples of water, soils and miscellaneous materials have been collected during the investigations.

Dr. J. Wyllie, in the Canadian Public Health Journal, Volume 28, No. 3, (1937), has recorded an experience of his in which a well water was contaminated with arsenic. The situation there is not comparable to that found at Roberts in this state but he describes a method by which he determined that the arsenic was in an insoluble condition. The water under examination was passed through a Seitz filter, the filtrate showing no arsenic whereas the residue showed the total amount which was present in the water. This method was used in our work but unlike Dr. Wyllie, we found that the arsenic in the Roberts water was largely in solution.

At this writing no more definite conclusions have been reached than that the people died of arsenic poisoning, that the water which they drank had a high arsenic content and that the conditions are such that it appears possible for arsenic to be carried through the ground by water from the alleged nearby possible sources. Two new wells have been drilled since our investigations and, therefore, we will have opportunity to test the theory of Dr. Perry of the State School of Mines,

Butte, that the lower waters should be found protected from the surface influences. Certainly the sanitary aspects of the deeper waters are more favorable than those of the shallower waters.

### Miscellaneous Field Activity

Continuing the work which was done in cooperation with the agents of the Federal Government on Facility Security, a recheck of the situation at Anaconda was made. This work has been discontinued as of this writing since there appears to be no further concern, especially in respect to possible sabotage.

The contamination of the ground waters by infiltration of gasoline was studied at Fairfield in Teton County. From one or more sources gasoline has traveled through the soil in this community until it has effected a number of the private wells. The most serious situation was found in a barber shop where an explosion occurred resulting in the destruction of the building by fire. The fumes of gasoline evidently came through the soil and from the water in a well in the building. A well in a building adjacent to this barber shop was found to contain a large amount of gasoline which could be drawn out with a bucket and rope. This was evidently an accumulation which was seeping into the well from the surrounding ground. This gasoline had a brown color typical of some of the products dispensed at adjacent service stations. It was said to be good gasoline so far as the use of it in automobiles was concerned. This is but another of the troubles which have been encountered due to the travel of gasoline through soil. These troubles are noticeable where the sub-soil immediately under the surface is of gravel and sand since it is through such type of soil that the gasoline will travel in the form of vapor and will reach the shallow ground water by which it will be carried to remote points. Deeper wells, draining the lower waters, are not effected, especially if they are protected by casings such as are used in drilled wells. The reason for this is that the upper layers of water do not pass downward through impervious strata which may lie above the deeper waters.

There appears to be no remedy so far as the clearing of water in shallow wells is concerned once such waters have become contaminated. The best protection appears to be the securing of water from deeper strata or the prevention of gasoline waste as on the ground or from storage tanks.

In June, 1943, at the request of Governor Ford, testimony was given at the hearing at Kalispell concerning the plan of the U. S. Army to increase the height of the dam on the Flathead River below Polson, thus raising the water elevation of Flathead Lake. A study of the situation and the plans which were proposed clearly indicated that water would be flooded back over low lying land in the vicinity of Kalispell seriously interfering with the proper disposal of sewage from that city. Testimony was given also that the flooding of low land in the vicinity of Polson would probably effect the public water supply through flooding of the city's transmission line and would possibly effect sanitary conditions at Somers.

Mention was made in our previous biennial report of the work done concerning disinfection of waters infected with tularemia organisms. One final experiment was conducted in the vicinity of Hamilton on a tributary of Gird Creek where water naturally infected was found. Two boxes were constructed into which the water was conducted from the creek and in which the water was disinfected. In this experiment an attempt was made to approximate conditions which would exist at a public water supply, disinfecting with liquid chlorine. The retention time of the water was controlled, the dosage of chlorine was controlled and samples were taken directly from the apparatus which was set up. The results obtained from the inoculation of guinea pigs bore out our previous opinion that disinfection with chlorine was adequate to remove contamination by tularemia organisms. Evidence thus found indicated that chlorine disinfection was to be resorted to where there was any danger from this organism. The details of all work done and results obtained are published in the July, 1943, issue of the Journal, American Water Works Association, Vol. 35, pp. 902-10.

The U. S. Army established a dog camp in Tenmile Canyon below Rimini which lies south and west of Helena. The tributaries of Tenmile Creek are the sources of the major portion of water supply for the City of Helena. Two problems arose in connection with this dog camp during the past biennium. The first was the proper disposal of the manure from the camp and the second was the possible effect which the camp might have upon the quality of the water used in the City of Helena. Studies were made which indicated that the manure could be satisfactorily disposed of providing the dumping grounds were sufficiently far from the creek and were covered with an impervious clay to prevent rain from seeping down into the creek. It was recommended, however, that for entire safety, the manure be hauled to an area located on a dry hillside far from the stream. No evidence was secured that at any particular time did the conditions at the camp harmfully effect the water used in the City of Helena. However, the officials at the camp were cooperative in keeping the grounds comparatively clean and the drainage in a comparatively good condition. The camp has been abandoned.

Mention was made in our last biennium of the extension of water testing laboratories in our larger cities, due to requirements of the Public Health Service standards. The Missoula laboratory was established in which four samples are tested each week by a member of the staff of the Montana Power Company. In Butte the work is done in the laboratory of St. James Hospital; in Anaconda, in the laboratory of St. Anne's Hospital; in Great Falls in the city water plant laboratory and at Billings in the water plant laboratory. Results of all local testings are submitted to the State Board of Health each month. Samples are tested in the State Board of Health water laboratory as formerly so that in these five places, as well as in many others, our schedules meet with the demands of the new Treasury Department Standard. The work done in these other laboratories has been satisfactory.

We took occasion during the past biennium to test the efficiency of sewage treating plants built by the U. S. Army at the so-called

satellite airfields at Lewistown and Glasgow, Montana. These plants were, for the most part, identical in design and construction, consisting in each case, of a coarse bar screen and Imhoff tank, a sprinkling filter and a secondary sedimentation basin. At Lewistown the final effluent was disinfected with liquid chlorine. Sludge was drawn from the Imhoff tank to an adjacent sludge filter bed and the accumulation in the secondary sedimentation basin was pumped to the influent of the Imhoff tank.

These plants, according to tests and observations, did an excellent job when properly operated. For the most part, the sewage recovered the oxygen satisfactorily after sprinkling. It is felt that this type of sewage treatment is applicable to some of our smaller communities where sufficient grade is available for gravity operation. It is relatively economical in construction and there is a minimum of operational cost involved.

At the request of the U. S. Navy, two surveys were made with an epidemiologist team headed by Dr. B. J. Pipe (Lt. MC-V(S)-USNR). These were made at Carroll College in Helena and at the State School of Mines at Butte where V-12 programs were in effect. Our principal activity was the investigation of the water supply and of swimming facilities. In connection with the Butte school Dr. Pipe, in making his report stated in part, "Health conditions in general reflect good sanitation." Relative to Helena, his report states in part, "Health conditions are good in general. The low rates for intestinal disease during the year reflect good water, milk, and food supply to the Navy students."

### **Housing**

There have been some war housing projects for industrial workers established in Montana. These are at Great Falls and at Roundup. Our work in connection with these consisted in reviewing plans and in advising the Federal government concerning the water supply and sewage disposal facilities in those communities.

At Clyde Park a housing project was proposed in which trailers would be established for workers at a nearby mine. The city authorities were contacted relative to the quality of the public water supply and the ground was viewed in respect to the possibilities of sewage disposal. This housing project was abandoned as of August 1, 1944. Improvements to the city water system were outlined and recommendations were made.

A housing project with 25 units is being established at Gallatin Gateway. The plans have been reviewed and approved. Water will be secured from a drilled well and sewage will be disposed of into the soil after passing through a septic tank. This housing is for men working in a nearby mine. Trailer houses are to be used.

A housing project is proposed for Drummond since there is apparently a shortage of housing facilities for men working at a nearby mining operation. Water is to be secured, according to the present

plans, from a drilled well and a septic tank soil disposal system is to be utilized for the disposal of the sewage. It is understood that houses will be brought to this site possibly from Anaconda where they are no longer in use.

Assistance has been given to the Federal War Food Administration in regard to the housing of farm labor. The assistance has consisted of advice concerning the State health regulations and suggestions for the writing of minimum requirements.

### Certification of Water Supplies

The U. S. Public Health Service has assisted the State Board of Health in inspections necessary for certification of waters used on inter-state carriers. The work of these officials has largely been in the inspection of watering point sanitation. We have made the water supply inspections. In 1942, twenty-one reports and recommendations were made calling for 16 approved and 5 provisional certificates. In 1943 we made reports and recommendations covering 19 supplies, 16 of which were approved and 3 of which were provisional. The work for 1944 is not yet completed.

From May 3 to May 7, 1943 the Director of the Division was in Salt Lake City assisting the State Merit System Council in giving oral examinations to members of the Staff of the Utah State Board of Health. In this activity he was associated with Dr. Berry of the Idaho State Board of Health, and Dr. Gebhart of the University of Utah.

### Tabulation of Field Work

The following tabulation shows the amount of field work done during the past twenty-four months:

|   | Number | Per Cent<br>of total |
|---|--------|----------------------|
| Inspection of Public Water Supplies .....   | 250    | 39.2                 |
| Inspection of Private Water Supplies .....  | 94     | 14.8                 |
| Inspection of Sewage Disposal Systems ..... | 131    | 20.0                 |
| Inspection of Swimming Pools .....          | 28     | 4.5                  |
| Miscellaneous Inspections .....             | 137    | 21.5                 |
| <hr/>                                       | <hr/>  | <hr/>                |
| Total .....                                 | 640    | 100.0                |

### Office Work

The office work consists in the writing of reports on all laboratory work done, or field investigations made, and in replying to letters of inquiry relative to matters which concern this Division. It also includes the inspection of plans which are submitted for various public water supply and sewage disposal systems, school buildings, and swimming pools.

### Fees

The state law authorizes the State Board of Health to establish a system of fees for services rendered in connection with the inspection and testing of water supplies. The fees are levied against the water utility on an annual basis. The money thus collected is deposited with the State Treasurer and goes into the general fund of the state.

For the fiscal year 1942-43 the fees collected were \$3,630.00 and for the fiscal year 1943-44 they were \$4,212.50. These collections amount to almost 3.4 per cent more than the total levied for the two years, some previous delinquencies having been collected.

### Examination of Plans

A total of 29 plans were examined during the past 24 months, classified according to the following tabulation:

|  |        |
|--|--------|
| New City (Public) Water System .....                           | 1      |
| Extensions and Improvements to Existing Public Water Sys. .... | 6      |
| New City (Public) Sewer Systems (inc. treatment plants) .....  | 1      |
| Extensions and Improvements to Existing Public Sewer Sys. .... | 1      |
| Other Industrial Sewage Disposal Systems .....                 | 2      |
| New and Additions to Public School Buildings .....             | 10     |
| Miscellaneous (Mostly Public Buildings) .....                  | 3      |
| Sanitation of War Housing .....                                | 5      |
| <br>Total .....  | <br>29 |

### Montana Section, American Water Works Association

This organization, of which the Director of the Division of Sanitary Engineering is Secretary, is active. It has held two annual meetings in the past biennium, one in Billings in 1943, and the other at Bozeman in 1944. The organization is in good condition, having at the present time a membership of fifty-five.

### Montana Section, Sewage Works Association

Last spring in Bozeman, a number of municipal officials met informally and decided it was time to organize a Sewage Works Association in this state. The objects of this Association as set forth in the constitution are, "The advancement of fundamental and practical knowledge concerning the nature, collection, treatment and disposal of sewage and industrial wastes and the design, construction, operation and management of works for the treatment of these wastes.

"The promotion and encouragement of improved waterways sanitation, through the same measures.

"The encouragement of a friendly exchange of information and experience among its members, and other interested persons, by an annual convention of its members, the publication of proceedings of its meetings, affiliation with the Federation of Sewage Works Associations, and the participation in the activities of the organization."

The constitution has been approved by the Federation of Sewage Works Associations, which is a national organization and we are now a member of that Federation. Our efforts to secure members have but recently started and to date we have 11 members. We anticipate that this will be doubled by the first of the year. In view of the benefits derived from the Water Works Association, we anticipate the same for sewage disposal and stream pollution abatement. The Director of this Division is also Secretary of the new organization.

In October, 1943, it was found possible to enlarge the quarters housing this Division. More than double the floor space available to the Division previously is now used. This is a distinct advantage to all phases of the work. The water testing laboratory is in a better condition and is better situated. More room for office activities make for greater efficiency in the work.

#### For the Future

During the coming years it is anticipated that this Division will continue the activities so far found by experience to be fully justified and should be ready to extend its activities as demanded by conditions due to the war or to the peace which will follow.

Such activities as the sanitary surveys, work on fluorine content of waters, the testing of sewage treatment plants to determine their efficiencies, the technical instruction of sewage plant operators and the assisting of the general public through circulars of information concerning sanitation are among the more important activities seen at this time.

The present staff is kept constantly busy and is the minimum which should be maintained if the services for which we are called upon are to be satisfactorily performed.

In concluding this report it is our pleasure to express appreciation for the cooperation given this Division by the other divisions of the State Board of Health and also the valuable assistance given us by W. M. Cobleigh, Dean Emeritus of the State College at Bozeman. The engineers of the U. S. Public Health Service have also given us valued assistance whenever we have requested it. For this we are grateful.

Respectfully submitted,

H. B. FOOTE, Director,

Div. of Sanitary Engineering.

**BIENNIAL REPORT OF THE FOOD AND DRUG DIVISION**

October 31, 1942 to October 31, 1944

**Elton M. Andrew, M. A., Acting Director.**

**Ludwig S. Champa, B. S., Analyst.**

**Richard M. Flemming, Sanitary Inspector.**

**Marjorie W. Kennett, Stenographer.**

**O. E. Sheppard, Ph. D., Consultant, Bozeman.**

To: W. F. Cogswell, M. D., Executive Officer:

It is my duty and privilege to herewith submit the biennial report of the Food and Drug Division of the Montana State Board of Health for the period beginning October 31, 1942 and ending October 31, 1944.

The Food and Drug Division of the State Board of Health functions to protect the health of the people by securing for them, as far as possible, foods and drugs that are not adulterated, misbranded, handled, or served under insanitary conditions. Work is conducted under authority of the State Food and Drug Act of 1911 and consists of:

1. Cooperating with local, county, and reservation health officers in making inspections.
2. Enforcing regulations adopted by the State Board of Health under authority granted the Board by law.
3. Licensing food handling and food manufacturing establishments as required by law.
4. Revoking licenses of insanitary establishments.
5. Collecting samples of food and drugs for laboratory analysis to determine whether or not they comply with the law.
6. Prosecuting those found selling illegal foods or drugs or otherwise failing to comply with the Food and Drug law.
7. Cooperating with Federal authorities in the control of interstate shipments of foods and drugs.

**INSPECTIONS**

Since early in 1942, the Food and Drug Division of the State Board of Health, in common with many other departments, has operated with a smaller personnel than is the usual custom. According to the law of the State of Montana, the local health officers and their deputies are supposed to check and inspect every establishment within their areas once each thirty days, and a complete report is to be mailed to the State Board of Health.

To facilitate this inspection work, blanks are furnished for noting sanitary conditions about the establishments, and they are to be graded or scored according to conditions noted. The ideal situation is one in which the local health officer handles all minor complaints and violations without asking for aid from this office. However, it is customary for most local inspectors or health officers to consult with us concerning these violations, and we are called upon to write many letters concerning the conditions which have been noted.

During the past biennium there has been a marked decrease in the number of inspections by local health officers. We attribute this largely to the fact that most health officers within the state are operating on a part-time basis, and the press of private practice does not allow them to carry on adequate inspection programs. Of the 91 health officers employed in this state, reports were received from only 20.

Five counties of the state operate under the county-city health unit plan. However, of these five counties, at the present time there are only three that have full time sanitary inspectors. Despite this fact, these three sanitary inspectors furnish the larger share of the reports received from the county officers. In one city of the state, there is a city inspector who reports regularly to the State Board of Health. This city is in a county which does not have a full time city-county unit.

During the past 2 years we have received from health officers and inspectors 12,576 inspections. In 1943, during the summer months, the state department had two full-time sanitary inspectors. In 1944, we had only one full-time sanitary inspector. In the biennium the state office made 9,642 sanitary inspections.

| Biennium        | Inspections by<br>Health Officers | Inspections by<br>Department | Number of<br>Licenses Issued |
|-----------------|-----------------------------------|------------------------------|------------------------------|
| 1935-1936 ..... | 21,219                            | 6,814                        | 10,358                       |
| 1937-1938 ..... | 28,386                            | 4,822                        | 11,749                       |
| 1939-1940 ..... | 25,481                            | 10,652                       | 12,593                       |
| 1941-1942 ..... | 21,161                            | 10,122                       | 12,177                       |
| 1943-1944 ..... | 12,576                            | 6,119                        | 9,642                        |

Tourist camp inspections and tourist camp licensing during the past biennium decreased considerably. In 1941 and 1942, we inspected 532 and 460 camps, respectively. In 1943 and 1944, we inspected and licensed 372 and 341 camps, respectively. Because of the fact that many camps were operating on a full-time rental basis rather than on a transient basis, we have not graded camps since 1942. However, we find upon examination of the inspection reports that most camps are maintaining their previous high standards. In addition, we have added to our list some dude ranches which were not formerly inspected. We believe that when the dude ranches find out the value of the services which we can render to them they will ask for State Board of Health licenses.

## LICENSES

Since 1921 licenses have been required of all food handling establishments within the State of Montana. These establishments include public eating places, meat markets, manufacturing bakeries, delicatessens, confectioneries, bottling works, canneries, soda fountains, ice cream parlors, soft drink establishments and beer parlors, tourist camps, and guest lodges. The licenses required of tourist camps were included in an act passed in 1929.

Listed below are the number of licenses collected and the fees for those licenses over a period of years extending back to the year 1922.

| Year       | Food<br>Licenses | Camp<br>Licenses | Fees<br>Collected |
|------------|------------------|------------------|-------------------|
| 1922 ..... | 2,974            | .....            | \$ 5,948          |
| 1929 ..... | 4,268            | 117              | 8,770             |
| 1936 ..... | 5,116            | 322              | 10,876            |
| 1938 ..... | 5,413            | 480              | 11,786            |
| 1939 ..... | 5,779            | 517              | 12,592            |
| 1940 ..... | 5,773            | 558              | 12,662            |
| 1941 ..... | 5,780            | 532              | 12,624            |
| 1942 ..... | 5,405            | 460              | 11,730            |
| 1943 ..... | 4,520            | 372              | 9,784             |
| 1944 ..... | 4,409            | 341              | 9,500             |

Licenses issued by the State Board of Health are primarily regulatory. Under the law an establishment operating in an insanitary or unsatisfactory manner may have its license revoked and the establishment ordered to be closed until such time as it is placed in good condition. We have attempted to use this authority only as a last resort and only if the operator of the establishment has been warned of the insanitary conditions and given ample time in which to correct them.

We have, in connection with these inspections, started a new system of duplicate checking on all establishments in the state. By devising an inspection form which can be carried by the sanitary inspector, the inspector is able to look back to former inspections and check to see what improvements have been made. Any letters or recommendations prescribed for insanitary establishments are attached to these inspections in order that the inspector may refresh his memory. We have found that this system has been quite satisfactory and has resulted in considerable improvement.

Due to the war time conditions, and the fact that a considerable portion of our people are now in the armed forces or in war industries in other states, the number of licensed food handling establishments has tended to decrease since 1942. We have found that the number of inspections has dropped approximately 13 per cent.

## FOOD ESTABLISHMENT SANITATION

It is fundamental that any establishment operating to manufacture or dispense foods or beverages must have good water, fly-tight toilet facilities, and adequate, prompt disposal of garbage. It is also necessary that all work areas, store rooms, and utensils be kept in good condition and adequate refrigeration be provided for spoilable foods in the amounts usually kept on hand. Personal cleanliness of those engaged in the preparation, distribution, and sale of foods is also very important.

Probably one of the greatest hazards with which we have to contend in this present day and age is the improperly washed glass, knife, fork, spoon, or other utensil with which the mouth may come in contact during eating or drinking. Such improperly washed materials may be responsible in part for the spread of such diseases as mumps, diphtheria, tuberculosis, measles, influenza, cerebrospinal fever, whooping cough, Vincent's Angina, lobar pneumonia, common colds, scarlet fever, and German measles.

### PROSECUTIONS

The Food and Drug Law does not provide for, nor is it the policy of the State Board of Health to prosecute every violation of the laws or regulations. However, continued violation and disregard of warnings is followed by complaints being filed with the county attorneys having jurisdiction. This often does not mean the guilty party is punished as provided for by law. At certain seasons, notably election years, it has been difficult to get some county attorneys to take any action.

It would be advisable for the Board to be able to retain their own attorney to whom all cases for prosecution could be referred for prompt and efficient action and eliminate the dilatory methods employed by some county attorneys.

Fines collected as a result of prosecution for violation of the Food and Drug laws are deposited with the State Treasurer to be placed in the General Fund.

In the past biennium, no complaints were filed against any food handlers in the State of Montana. We have adopted a policy of notifying county attorneys of violations and asking them to inform the violators of the consequences involved, if complaints are sworn out against them. The results of this program have been very satisfactory and as a consequence we have not had to appear in any court in Montana.

We have adopted this program particularly because of certain war conditions which exist. It is extremely difficult for food handlers to acquire proper materials for renovating and remodeling, and in many instances, even when materials were acquired, no one could be found who could take care of the construction work.

The sanitary conditions of food handling establishments throughout the state remain about as has been found in previous years. We have found that many places which were violators have gone out of business and this fact has reduced the necessity of prosecutions.

## LABORATORY

In the past two years the laboratory has analyzed 2,666 samples. The following table shows how these samples were classified in the laboratory.

|                              | Passed | Not Passed | Investigational | Unofficial | Referred | Total |
|------------------------------|--------|------------|-----------------|------------|----------|-------|
| Meat and Meat Products ..... | 872    | 222        | 19              | 4          | ....     | 1,117 |
| Carbonated Beverages .....   | 82     | 126        | ....            | 1          | ....     | 209   |
| Drugs .....                  | 1      | ....       | ....            | ....       | (12)     | 13    |
| Dairy Products .....         | ....   | ....       | ....            | ....       | 618      | 618   |
| Fruits & Vegetables .....    | ....   | ....       | ....            | ....       | 5        | 5     |
| Liquor .....                 | ....   | ....       | ....            | ....       | 11       | 11    |
| Poisons .....                | 2      | 1          | 7               | ....       | 8        | 18    |
| Miscellaneous .....          | ....   | 4          | 15              | 7          | 14       | 40    |
| Water Samples .....          | ....   | ....       | ....            | ....       | 634      | 634   |

Since 1941 we have added to the laboratory the work of chemical analyses of water for the Sanitary Engineering Division. Starting in July of this year we have analyzed in our laboratory 134 samples of water suspected of arsenic poison. These samples were all from the town of Roberts, Montana, and the immediate vicinity. Two deaths in Roberts, Montana, are attributed to arsenic poison resulting from improper storage of sodium arsenite used to poison Mormon crickets. A complete report on this will be found in the Sanitary Engineering Division's biennial report.

The work done in the Food and Drug Laboratory has increased in variety in the past two years. In addition to the work done directly for the Food and Drug Division, our laboratory also does the analyses work for the Dairy Division and the Horticulture Division of the Department of Agriculture. We also do the laboratory analyses for the Liquor Control Board, and the water analyses for the Livestock Sanitary Board.

Some special research work was done in the past year in cooperation with the Office of Price Administration in Washington, D. C.

In addition to the regular routine work of the laboratory, we also did analysis work on the following miscellaneous products:

|                               |                        |
|-------------------------------|------------------------|
| Coffee                        | Pork sausage seasoning |
| Salmon                        | Candy                  |
| Canned fruit of various types | Disinfectants          |
| Salad dressing                | Tankage                |
| Honey                         | Prune juice            |
| Milk                          | Shrimps                |
|                               | Numerous other items   |

Special work was done for the sheriff of Lewis and Clark county in two poison cases occurring in his county. Positive results were

obtained in both cases. Deaths had occurred due to an overdose of phenobarbital and acute alcoholism. Two samples were also analyzed in the laboratory in cooperation with the Federal Food and Drug Administration at Denver.

The following table shows the action which was taken on the samples analyzed in our laboratory.

|                               | 1935-36 | 1937-38 | 1939-40 | 1941-42 | 1943-44 |
|-------------------------------|---------|---------|---------|---------|---------|
| Samples Passed .....          | 244     | 183     | 1,775   | 1,549   | 957     |
| Samples Not Passed .....      | 122     | 143     | 1,325   | 778     | 353     |
| Unofficial .....              | 50      | 28      | 385     | 39      | 12      |
| Investigational .....         | 167     | 95      | 102     | 41      |         |
| Referred to Other Depts. .... | .....   | .....   | 447     | 668     |         |
| Water Samples .....           | .....   | .....   | 208     | 634     |         |
|                               | 416     | 521     | 3,580   | 3,119   | 2,666   |

### SPECIAL INVESTIGATION

Special investigations were carried on in three cases in cooperation with the Federal Food and Drug Administration. A complete survey was made of fire damaged goods at the Safeway warehouse in Butte. The Food and Drug Division supervised the sorting of a carload of whole coffee beans at Billings, Montana.

Samples of prophylactics were obtained at the request of the Federal Administration in Great Falls. Several investigations were carried on for the Federal Food and Drug Administration on which no action was taken. These were concerned mainly with the testing of fruit products with excessive spray residue. The Food and Drug Division has also carried on in cooperation with the State Board of Pharmacy a rather extensive program on the control of the sale of habit-forming drugs. A special investigation was made of one case in particular which occurred at Havre, Montana. A firm operating in the State of Illinois shipped into this state a considerable amount of phenobarbital for the relief of epilepsy. Two severe cases were noted by the health officer of Hill County and were reported to this office. Further work is being done with the Board of Pharmacy in an effort to control this illegal sale of habit-forming drugs.

At the request of the Sanitary Engineering Division of the Board of Health, four special investigations on public water supplies were carried on.

In cooperation with the Department of Agriculture, all flour mills within the State of Montana were examined for infestation by weevils or other insects. Three of these mills were told to clean up their establishments and keep them free from possible contamination.

In the past two years the Food and Drug Division has been called upon to certify food handling establishments to the War Production Board for the purchase of necessary equipment and replacement fix-

tures. Most of these have been in connection with toilet and rest room facilities in bars and restaurants. We have also certified four meat markets in the state for the installation of new refrigeration equipment which was necessary for the maintenance of sanitary conditions for the storage of fresh meats.

### **HOTEL INSPECTION**

The Montana Hotel Law provides that the State Board of Health shall adopt rules for the enforcement of the Act and also shall have authority to engage or appoint such assistants or inspectors as may be needed in enforcing the Act. Under this authority it has been made the duty of each city, county, or reservation health officer to make an annual inspection of all hotels in his district. Blanks are furnished the health officer by the State Board of Health so that a report can be submitted as to the condition of the establishment. Copies of the state hotel laws and regulations are furnished for distribution. Particular stress is laid on cleanliness, length of sheets, ventilation, fire escapes, and general sanitation.

### **CLERICAL WORK**

Since the Food and Drug Division has been able to employ a full time stenographer the office work has increased considerably. Collection reports concerning the analyses of samples collected are returned more promptly. All food handling establishments having a grade below 90 are written and have letters concerning conditions which must be met to satisfy the regulations. These letters are now sent out within two weeks after the inspections have been made.

By revising our license forms and application forms, the mailing of licenses and the handling of moneys collected is more efficient and accurate.

There has been a marked increase in requests for information concerning laws and regulations from manufacturers and agents concerned with food handling and processing. In January, 1943 a new and revised copy of the laws, rules, and regulations of the Food and Drug Division was printed and is available for mailing.

### **MISCELLANEOUS ACTIVITIES**

During the 1943 session of the legislature the Food and Drug Division of the State Board of Health approved a short form of the Uniform Food and Drug Act.

The Director of the Food and Drug Division appeared before three committee hearings concerning this Act. The Act was vetoed by the Governor of the State of Montana at the request of the agricultural interests. This Act in itself was not complete and it is now the opinion of the Director of the Food and Drug Division that it would have caused considerable dissension.

At the present time, we are working on the Uniform Food and Drug and Cosmetic Act approved by the Food and Drug Officials Association. This bill will be introduced in the 1945 session, and it is hoped that the legislature will see fit to enact this bill as a law of the State of Montana.

During the biennium, the director of the division has appeared before six civic organizations and has given talks concerning the food and drug laws of the State of Montana and its relation to the Food and Drug Act of 1938. In 1943 the director of the division attended the national meeting of the Food and Drug Officials Association at Denver. The director also attended state meetings of the Bottlers of Carbonated Beverages, the Meat Packers Association, a meeting of the State Board of Pharmacy, and the Pharmaceutical Association. Two lectures were given before the Home Economics Class at Montana State College.

Credit must be given to members of the staff who are not at the present time employed by the State Board of Health. These include Marshall Pollock, chemist; Kenneth E. Johnson, sanitary inspector; Ruth Pitcher, stenographer; and Shirley Cowell, stenographer.

The work of the Food and Drug Division will continue to be curtailed to some extent during the present emergency. However, plans are being made for a more complete program on the cessation of the war. In the meantime, the Food and Drug Division will continue to carry forward what we feel is the most adequate program for the protection of the people of the State of Montana. This will be done at a minimum of expense and with a maximum amount of effort.

Respectfully submitted,

ELTON M. ANDREW,

Acting Director,

Food and Drug Division.

**REPORT OF THE HYGIENIC LABORATORY**

To: W. F. Cogswell, M. D., Executive Officer.

Personnel as of November 1, 1944:

**Edith Kuhns, B. S., Director.**  
**Harry P. Gelsing, B. A., Assistant Director**  
**David F. Hall, B. S., Senior Bacteriologist.**  
**Mary Louise Hall, B. A., Junior Bacteriologist.**  
**Irene Fleming, B. S., Junior Bacteriologist.**  
**Harold Barnes, Laboratory Assistant.**  
**Annabelle Houchin, Junior Stenographer.**  
**Frances Henter, Typist.**  
**Donald Moe, Laboratory Helper.**  
**E. D. Hitchcock, M. D., Consultant.**

The main function of the Hygienic Laboratory Division continues to be to aid in the diagnosis, investigation, and control of communicable disease. This is done directly through the doctors, clinics and hospitals of the state and through close cooperation with other divisions of this Department and with other state departments. Other functions include annual registration and inspection of all hospital laboratories undertaking examinations for communicable disease, conferences with physicians when requested and carrying on various administrative activities of a miscellaneous nature.

The volume of work done in the last biennial period showed a slight decline under the previous biennium. A total of 227,737 examinations were completed from November 1, 1942, to November 1, 1944, a decrease of 13,247 from the previous period. This decline as evidenced by the accompanying Table I was largely due to a decrease in submission of blood and spinal fluid specimens for examinations for syphilis occasioned by the drop in Selective Service bloods. However, decreases also occurred in most other types of work, notably in specimens submitted for examination for gonorrhea, tuberculosis and in bloods for agglutination for the enteric fevers. A small increase was noted in agglutinations for tularemia and in body fluids for guinea pig inoculation for tuberculosis.

Table II shows in detail the examinations made for the reportable period. Table III shows the number and types of containers distributed for this same period. Table IV shows the relative number of examinations for venereal disease in comparison with the total volume of examinations.

TABLE I

|                                   | 1940-42 | 1942-44 | Gain<br>or Loss |
|-----------------------------------|---------|---------|-----------------|
| Total Syphilis                    | 217,562 | 210,228 | -7,334          |
| Blood and Spinal Fluid Wassermann | 105,207 | 104,700 | -507            |
| Blood and Spinal Fluid Kahn       | 109,661 | 103,750 | -5,911          |
| Treponema, Smears and Sera        | 49      | 72      | - -23           |
| Spinal Fluid, C. G. and Globulin  | 2,645   | 1,706   | -939            |
| Total Gonorrhea                   | 4,008   | 1,839   | -2,169          |
| Smears                            | 3,217   | 1,746   | -1,771          |
| Complement Fixation               | 777     | 1       | -776            |
| Cultures                          | 14      | 92      | - -78           |
| Tuberculosis                      | 2,776   | 2,267   | -509            |
| Sputum, Microscopic               | 1,865   | 1,889   | - -24           |
| Other Body Fluids                 | 104     | 64      | -40             |
| Complement Fixation               | 525     |         |                 |
| Guinea Pig Inoculation            | 273     | 309     | - -36           |
| Culture                           | 9       | 5       | -4              |
| Agglutinations                    | 10,939  | 6,396   | -2,543          |
| Typhoid-Paratyphoid Fevers        | 7,822   | 5,466   | -2,356          |
| Undulant Fever                    | 1,950   | 1,650   | -300            |
| Tularemia                         | 1,167   | 1,221   | - -54           |
| Proteus OX19                      |         | 59      | - -59           |
| Blood Cultures                    | 1,919   | 1,655   | -264            |
| Urine and Feces Culture           | 399     | 365     | -34             |
| Diphtheria                        | 2,212   | 1,821   | -391            |
| Miscellaneous                     | 1,179   | 1,166   | -13             |
| GRAND TOTAL                       | 240,984 | 227,737 | -13,247         |

TABLE II

Report of Laboratory Examinations for Nov. 1, 1942 to Nov. 1, 1944

TABLE II—(Continued)

Report of Laboratory Examinations for Nov. 1 1942 to Nov. 1, 1944

TABLE II—(Continued)

Report of Laboratory Examinations for Nov. 1 1942 to Nov. 1, 1944

|                               | Positive | Doubtful | Negative | Unsatisfactory | Unclassified | Total Exams | Total Specs. |
|-------------------------------|----------|----------|----------|----------------|--------------|-------------|--------------|
| Vincent's Infection           |          |          |          |                |              |             |              |
| Smears                        | 62       | 5        | 27       | -----          | -----        | 94          | 94           |
| Culture                       | 1        | -----    | -----    | -----          | -----        | 1           | 1            |
| Malaria                       |          |          |          |                |              |             |              |
| Blood Smears                  | 3        | -----    | 10       | 4              | -----        | 17          | 17           |
| Whooping Cough                |          |          |          |                |              |             |              |
| Cough Plates                  | -----    | -----    | 11       | -----          | -----        | 11          | 11           |
| Bacteriological               | -----    | 1        | -----    | -----          | -----        | 1           | 1            |
| Vaccines Prepared Autogenous  | -----    | -----    | -----    | -----          | 1            | 1           | 1            |
| Special Investigations        |          |          |          |                |              |             |              |
| Food Poisoning                |          |          |          |                |              |             |              |
| Bacteriological               | -----    | -----    | 4        | -----          | 16           | 20          | 20           |
| Toxic                         | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Microscopic Examinations      |          |          |          |                |              |             |              |
| Bacteriological Examinations  | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Serological                   | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Chemical                      | -----    | -----    | -----    | -----          | 1            | 1           | 1            |
| Animal Tests                  | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Discharges: Pus, Sputum, etc. |          |          |          |                |              |             |              |
| Microscopical                 | -----    | -----    | -----    | 6              | 6            | 6           | 6            |
| Bacteriological               | -----    | -----    | 1        | 2              | 3            | 3           | 3            |
| Pleural & Other Fluids        | -----    | 1        | -----    | -----          | 1            | 1           | 1            |
| Blood                         |          |          |          |                |              |             |              |
| Cultures (not Typhoid)        | 1        | -----    | 24       | -----          | 30           | 55          | 25           |
| Red Cell Count                | -----    | -----    | -----    | 1              | 1            | 1           | 1            |
| White Cell Count              | -----    | -----    | -----    | 7              | 7            | 7           | 5            |
| Diff. Count                   | -----    | -----    | -----    | 10             | 10           | 10          | 9            |
| Hemoglobin                    | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Spinal Fluid                  |          |          |          |                |              |             |              |
| Microscopical                 | -----    | -----    | -----    | 2              | 2            | 2           | 2            |
| Cell Count                    | -----    | -----    | -----    | 2              | 2            | 2           | 2            |
| Bacteriological               | -----    | 1        | -----    | 53             | 54           | 54          | 25           |
| Chemical                      | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Urine Analysis                |          |          |          |                |              |             |              |
| Microscopical                 | -----    | -----    | -----    | 17             | 17           | 17          | 17           |
| Physical & Chemical           | -----    | -----    | -----    | 16             | 16           | 16          | 1            |
| Bacteriological               | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Quantitative                  | -----    | -----    | -----    | 1              | 1            | 1           | -----        |
| Nasal Smears                  |          |          |          |                |              |             |              |
| Eosinophiles                  | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Organisms                     | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Miscellaneous Examinations    |          |          |          |                |              |             |              |
| Feces for Occult Blood        | 2        | -----    | 3        | -----          | -----        | 5           | 5            |
| Cultures for Identification   | -----    | -----    | -----    | 10             | 10           | 10          | 10           |
| Specimens for Confirmation    | -----    | -----    | -----    | 1              | 1            | 1           | 1            |
| Breast Milk                   | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Smears for Organisms          | -----    | 6        | -----    | 42             | 48           | 48          | 48           |
| Cultures for Organisms        | -----    | 7        | -----    | 92             | 99           | 99          | 99           |
| Heterophile Antibodies        | 4        | 9        | 63       | -----          | 76           | 76          | 44           |
| Sterility Tests               | -----    | -----    | 4        | 4              | 8            | 8           | 8            |
| Animal Tests (Autopsies)      | -----    | -----    | -----    | -----          | -----        | -----       | -----        |
| Proteus OX-19                 | 2        | 4        | 53       | -----          | 59           | 59          | 8            |
| Unclassified                  | -----    | -----    | -----    | 21             | 21           | 21          | 21           |
| Kala-Azor (Napier's S.T.)     | -----    | 1        | -----    | -----          | 1            | 1           | 1            |
| Smear for Anthrox             | -----    | 2        | -----    | -----          | 2            | 2           | 2            |
| Rh. Grouping                  | -----    | -----    | -----    | 26             | 26           | 26          | 23           |
| Rat Bite Fever                | -----    | 1        | -----    | 1              | 2            | 2           | 2            |
| Blood for Stippling           | -----    | 1        | 3        | -----          | 4            | 4           | 4            |
| Urine for Organisms           | -----    | -----    | -----    | 156            | 156          | 156         | 156          |
| Blood for Typing              | -----    | -----    | -----    | 1              | 1            | 1           | 1            |
| Culture for Anthrax           | -----    | 1        | -----    | 1              | 2            | 2           | 2            |
| <b>TOTAL</b>                  | -----    | -----    | -----    | -----          | 227,737      | 113,825     | -----        |

TABLE III

## Containers Distributed During Nov., 1942 to Nov., 1944

## Wassermann—

|                    |        |
|--------------------|--------|
| Containers .....   | 24,231 |
| Bottles .....      | 62,507 |
| Keidel Tubes ..... | 38,322 |

## Diphtheria—

|                  |       |
|------------------|-------|
| Containers ..... | 976   |
| Tubes .....      | 2,925 |
| Swabs .....      | 2,743 |

## Tuberculosis—

|                  |       |
|------------------|-------|
| Containers ..... | 2,306 |
| Bottles .....    | 2,375 |

## Gonorrhea—

|                  |       |
|------------------|-------|
| Containers ..... | 1,153 |
| Slides .....     | 2,252 |

## Feces—

|                  |     |
|------------------|-----|
| Containers ..... | 400 |
| Bottles .....    | 388 |

## Miscellaneous—

|                                |    |
|--------------------------------|----|
| Urine Containers .....         | 5  |
| Typhoid Containers .....       | 3  |
| Widal Outfits .....            | 29 |
| Vials—Miscellaneous .....      | 3  |
| Blood Agar Plates .....        | 74 |
| Blood Culture Bottles .....    | 6  |
| Blood Culture Containers ..... | 2  |
| Darkfield Outfits .....        | 11 |
| Cough Plates .....             | 4  |
| Blood Cultures .....           | 4  |
| Gonorrhea Culture Tubes .....  | 6  |
| Blood Culture Outfits .....    | 11 |
| Gonorrhea Cultures .....       | 12 |
| Culture Tubes .....            | 17 |
| Manuals .....                  | 15 |

TOTAL ..... 138,022

TABLE IV

## Total Examinations for Venereal Diseases

|                                     | 1942-43 | 1943-44 |
|-------------------------------------|---------|---------|
| Wassermann .....                    | 58,476  | 52,042  |
| Kahn .....                          | 69,476  | 51,589  |
| Treponema (Smear & Darkfield) ..... | 74      | 11      |
| Spinal Fluid (C.G. & Glob.) .....   | 874     | 926     |
| Total Syphilis .....                | 129,209 | 104,568 |
| G. C. Fixation .....                | 2       | 1       |
| G. C. Smear .....                   | 1,123   | 841     |
| Gonorrhea Cultures .....            | 88      | 18      |
| Total Venereal Disease Exams. ....  | 130,422 | 105,428 |
| Total Exams. of all types .....     | 137,932 | 113,441 |
| Total Specimens all types .....     | 75,858  | 56,578  |

## PERSONNEL

The laboratory staff, at present, consists of the director, assistant director, one senior bacteriologist, two junior bacteriologists, one junior stenographer, one typist, one laboratory assistant and one part-time laboratory helper.

The staff has been reduced within the last year by one stenographer, formerly needed to care for reports to the Selective Service, and one laboratory helper. At present, one laboratory assistant, with the assistance of one part-time helper, cares for the cleaning of glassware, packing and shipping of outgoing containers, the transportation of incoming mail as well as feeding and care of all laboratory animal stock. We have been extremely fortunate in retaining our scientific personnel without change within the last 18 months.

## Report of Scientific Work

**Syphilis.** A total number of 210,228 examinations for syphilis were made of which 104,700 were Kolmer Complement Fixation tests and 103,750 were Kahn Standard Precipitation tests. A total decrease of 7,334 was noted under those for the period 1940-42. We have now completed since November 1, 1944 a total of 88,711 examinations upon blood specimens for the Selective Service with 1.4 per cent giving positive serologic reactions.

Participation in the 1943-44 Annual Evaluation Study of Serologic Test for Syphilis by the U. S. Public Health Service resulted in the following comparative ratings.

## Kolmer Simplified Complement-Fixation Test

|               | Sensitivity | Specificity |
|---------------|-------------|-------------|
| Control ..... | 85.5%       | 99.4%       |
| Montana ..... | 80.6%       | 100.0%      |

## Kahn Standard Precipitation Test

|               | Sensitivity | Specificity |
|---------------|-------------|-------------|
| Control ..... | 82.1%       | 100.0%      |
| Montana ..... | 74.2%       | 99.4%       |

Discussion in detail of the other types of examinations will not be entered here in order to conserve space.

## Other Activities

The Director attended for eight weeks, from October 18, to December 18, 1943, a class in tropical medicine at the Army Medical School in Washington, D. C. The course was designed to train medical and laboratory personnel in the recognition of those tropical diseases most likely to be encountered in returning military personnel and was excellent in both presentation and material offered.

Fourteen of the 22 laboratories registered with the State Board of Health were visited and inspected in 1944.

**Investigations.** An investigation was made in Choteau the first part of September of the contacts of what appeared to be a carrier of amoebic dysentery. The case was a child hospitalized by the Crippled Children's Division for some corrective work and was discovered upon routine admission examinations. None of the family contacts showed signs of infection with the organism.

**Studies Undertaken.** A study has been undertaken by two of the workers in the division to determine the comparative value of the Ziehl-Neelsen method of staining acid-fast bacilli and the fluorescent staining method which employs the fluorescent dye auramine O. At the last tabulation when 180 specimens of sputum and other body fluids had been examined 7 per cent more positives were found by the fluorescent method. We consider this significant enough to warrant the institution of this method as a routine procedure. If this is done, it will necessitate the purchase of a new microscope since one of those now in use will need to be retained solely for this work.

After a comparative study of selective media most suitable for the isolation of the dysentery bacilli we have adapted the SS media for routine use since the percentage of recoveries have been much greater with this than any other.

## Educational Activities

The refresher course which was scheduled for laboratory and interested medical personnel was not undertaken, partly due to the

denial by the U. S. Public Health Service of our request for the assignment of a mulariologist for a three-day period and partly due to the inability of the laboratory workers to leave their positions for any protracted period due to labor shortages. The plans for such a course have not been abandoned, however, only postponed.

It is planned, beginning the first of next year, to distribute mimeographed copies of new methods and procedures to all registered laboratories.

Publicity is being prepared at the present time pertaining to a bill to be presented to the 1945 legislative body for consideration which will require all applicants making request for a marriage license in Montana to undergo a physical examination, including a blood test for syphilis. Thirty states at the present time require a blood test of both bride and groom. Three require examination of the groom only. Presented together with this bill will be a companion bill requiring all physicians to submit a blood specimen from every expectant mother under their care.

#### Proposed New Work

It is not anticipated that any great increase in the volume of work will occur until post war public health plans begin to materialize. The passage of state legislation which we propose, pertaining to premarital and prenatal examinations would bring in perhaps an estimated twenty thousand additional blood specimens for examination. This could be taken care of easily by our present staff especially if the anticipated decrease in Selective Service specimens occurs.

Passage of the above suggested legislation would necessitate evaluation of those laboratories within the state, wishing to participate in the program and formal approval of those which qualify. The preliminary work on this will probably be done on this in advance of the passage of the bill, so that no delay need be occasioned in its working if it be effected.

We are also considering at this time the advisability of establishing a state operated blood plasma bank which would have as its function the preparation and distribution of free blood plasma within the state. The extensive use of plasma in shock and surgical cases would seem justification for provision of this service. The neighboring state of North Dakota has established within the past year such a bank with apparent success. A study of costs and distribution concerned with a similar center is under way.

Pending approval of the necessary appropriation by the legislative, plans for a new Animal Unit are being prepared. The need for such a unit becomes more urgent each year, quarters being so crowded at present, that when an intercurrent infection occurs it is practically impossible to prevent the infection from sweeping through the entire animal population.

**Recommendations**

Your earnest consideration of the following discussed above is requested:

1. The need for a law requiring premarital and prenatal examinations for syphilis.
2. The establishment of a state blood plasma bank if studies show the cost of production and distribution to be compatible with the service offered.
3. The construction of a new Animal Housing Unit if appropriations are granted by legislative approval.

**Acknowledgements**

We wish again to gratefully acknowledge your help and guidance and thoughtful consideration of our problems as presented to you.

We also wish to thank the members of the other divisions for their continued cooperation.

Respectfully submitted,

EDITH KUHNS, Director.

**DIVISION OF INDUSTRIAL HYGIENE****Dohrman H. Byers, Acting Director**

Advisory Committee appointed by Montana State Board of Health:

**James D. Graham, President of the Montana Federation of Labor, Helena.**

**Dennis McCarthy, Representative of Trades and Labor Council, Butte.**

**J. J. Carrigan, General Manager of Mines, Anaconda Copper Mining Company, Butte.**

**Carl J. Trauerman, Secretary, Mining Association of Montana, Butte.**

**Dr. A. T. Haas, Chairman, Committee on Industrial Hygiene, Montana Medical Association, Missoula.**

• To: W. F. Cogswell, M. D., Executive Officer:

The following report presents a summary of the activities of the Division of Industrial Hygiene for the period from January 1, 1943, to November 30, 1944.

During this biennium, the Division has strived to carry out its program to obtain and to maintain the most healthful working conditions possible in the industrial establishments of Montana. The exigencies of wartime have greatly emphasized certain phases of our work and necessarily subordinated others. Every effort has been exerted to assist our war industries in combating their absenteeism problems due to health considerations. Much has been done and even more remains to be done.

The Division wishes to express sincere appreciation for the able assistance and counsel of the Advisory Committee which has done much to enhance the value of our services to Montana industry.

On January 1, 1943, the personnel of the Division consisted of Mr. Herbert T. Walworth, Director and Industrial Hygiene Engineer, Mr. Hilmer N. Hansen, Industrial Chemist, and Miss Solveig N. Lee, Senior Stenographer. Mr. Hansen had but recently joined the Division. He had been given several weeks of intensive training in the specialized methods of sampling and analysis required in industrial hygiene studies. Mr. Walworth resigned early in November, 1943, to accept a position with the Division of Industrial Hygiene of the Tennessee State Health Department. Due to the critical shortage of trained industrial hygiene personnel, it was not possible to engage anyone to fill the vacancy so the United States Public Health Service was called upon for assistance. The Service responded by assigning Mr. Dohrman H. Byers, Assistant Sanitarian (R), to the Montana State Board of Health to serve as Acting Director and Industrial Hygiene Engineer of the Division of Industrial Hygiene. Mr. Byers reported in January, 1944, and has directed the activities of the Division since that time.

There have been several notable additions to our laboratory and office equipment. A Coleman Spectrophotometer was purchased recently and promises to greatly facilitate certain necessary chemical analyses. The large number of carbon monoxide tests being made required that our instrument be in good calibration; therefore, a checking outfit was obtained. The filing cabinets have been equipped with Pendaflex frames and folders with a resultant increase in efficiency.

### **ABSENTEEISM REPORTING**

The Division advocates the keeping of complete absenteeism records as a means of locating causes of industrial illnesses. In order to foster the keeping of such records by the industrial companies of the state, the Division of Industrial Hygiene has offered to prepare a critical graphical analysis of the records for companies submitting their absenteeism figures regularly on forms prepared by the Division. At present, monthly reports are received from two plants employing approximately 1,750 persons.

### **EDUCATION**

The education of both management and labor to the advantages of industrial hygiene and the wastefulness of industrial diseases is an integral part of the Division's program. To this purpose, a number of talks were given to interested groups. A motion picture portraying industrial hygiene was shown to several audiences, and a large number of industrial health pamphlets and posters were distributed. Two series of posters portraying essential practices for good health for men and women in industry were used. These posters are designed and supplied at a moderate cost by the United States Public Health Service. The motion picture film, entitled "Save A Day," was prepared by the Division of Industrial Hygiene of the United States Public Health Service and was purchased by our Division for use in our educational work.

In September, 1944, a representative of the Chilean Government spent 15 days with the Division observing and receiving training in our industrial hygiene methods preparatory to returning to Chile to set up an industrial hygiene unit there.

### **OCCUPATIONAL DISEASE REPORTING**

During the 23-month period covered by this report, only two occupational disease reports were received. Both were cases of occupational dermatitis. Other cases of occupational diseases were revealed by our surveys or reported by companies requesting assistance. This phase of our program has undoubtedly suffered because of the pressure of the times upon our all too few physicians remaining in the state. A campaign to improve the reporting of occupational diseases is soon to be initiated. Such reports are one of our best means of determining where the services of the Division are most needed.

## FIELD STUDIES

The Division renders immediate and specific aid to industry in the form of environmental studies and surveys which are followed by detailed reports analyzing the hazards to health and recommending appropriate control measures. Such services were given to 55 plants employing 9,680 workers. Engineering studies of one or more specific hazards were made in each of 26 plants, while surveys of a more general nature were made in 22 additional plants. One or more follow-up visits were made to determine the efficiency and effect of recommendations in each of 23 plants. Seventeen studies were made at the request of management, and seven in response to requests from other sources.

Comprehensive engineering studies were made of the industrial hygiene problems of two of the largest plants in the state. Each of these studies required over several months of field and laboratory work. At each plant, the Division trained a company employee in the approved methods of sampling and analysing for the industrial poisons encountered. One plant now employs two chemists and one engineer in full-time industrial hygiene work, while the other employs a chemist full-time and an engineer part-time for this work.

Early in 1944, a study of the carbon monoxide hazard in the commercial and municipal garages of the state was started. During the warmer months, when doors and windows are usually open to provide adequate ventilation, the study was interrupted but with the return of cold weather, it has been resumed. There has been such an increase in the amount of automotive maintenance work that carbon monoxide has become a real hazard in garages not prepared to cope with the situation.

In cooperation with the Montana Industrial Accident Board and the U. S. Bureau of Mines, the Division has undertaken a study of health hazards resulting from the use of diesel engines in underground operations. This study is still in progress.

Throughout 1943, studies were made of the carbon monoxide concentrations in the cabins of aircraft used to train navy and army personnel. This study is unique in industrial hygiene. In this connection, it is interesting to note that our studies have taken the engineer and chemist 2,800 feet above the ground in the airplane studies, as well as 4,200 feet below ground level in a survey of dust conditions in a mine.

## LABORATORY AND FIELD ANALYSES

A total of 1,400 chemical analyses were completed in the Division's laboratory. Of these, 970 analyses were made for industrial poisons in samples of air, dusts, fumes, mists, and products obtained in the studies of the various health hazards encountered. An additional 430 analyses were performed in the course of control and development work on methods of analysis. Frequently, a new method must be developed or an old method modified to meet the specific conditions imposed by a particular study or a new hazard.

In the field, 2,167 determinations were made by means of direct reading instruments or portable test apparatus. The total of all laboratory and field determinations is 3,567 analyses. Table I presents a summary of this work according to the constituent determined.

TABLE I  
Summary of Chemical Laboratory and Field Analyses

| Materials Analyzed       | No. of Study Analyses | No. of Control and Development Analyses |
|--------------------------|-----------------------|---|
| Dust Counts—             |                       |   |
| Silica Dust .....        | 219                   | 40                                      |
| Coal Dust .....          | 12                    | 2                                       |
| Lead .....               | 170                   | 75                                      |
| Arsenic .....            | 142                   | 12                                      |
| Zinc .....               | 42                    | 105                                     |
| Antimony .....           | 66                    | 1                                       |
| Manganese .....          | 10                    | 1                                       |
| Cadmium .....            | 6                     | 95                                      |
| Selenium .....           | 6                     | 0                                       |
| Vanadium .....           | 5                     | 0                                       |
| Silica .....             | 4                     | 0                                       |
| Oxides of Nitrogen ..... | 140                   | 33                                      |
| Oxygen .....             | 52                    | 27                                      |
| Carbon Dioxide .....     | 52                    | 27                                      |
| Sulfuric Acid Mist ..... | 22                    | 3                                       |
| Sulfur Dioxide .....     | 13                    | 1                                       |
| Free Acid .....          | 2                     | 1                                       |
| Fluorine .....           | 2                     | 1                                       |
| Organic Solvents .....   | 2                     | 0                                       |
| Bacteriological .....    | 4                     | 0                                       |
| Field Determinations—    |                       |   |
| Illumination .....       | 600                   | 0                                       |
| Carbon Monoxide .....    | 491                   | 6                                       |
| Air velocity .....       | 401                   | 0                                       |
| Temperature .....        | 349                   | 0                                       |
| Relative Humidity .....  | 317                   | 0                                       |
| Combustible Gases .....  | 7                     | 0                                       |

## MONTANA STATE BOARD OF HEALTH

## ITEMIZED DIVISIONAL EXPENDITURES

October 1, 1942 to September 30, 1944

M. S. Stanley, Fiscal Agent

| ADMINISTRATION                       | State        | Total        | State | Federal      | Total        | Federal | State & Federal | Grand Total  |
|--------------------------------------|--------------|--------------|-------|--------------|--------------|---------|-----------------|--------------|
| Salaries                             | \$ 16,067.59 |              |       | \$ 8,325.00  |              |         | \$ 24,392.59    |              |
| Travel                               | 944.51       |              |       | 1,501.74     |              |         | 1,466.25        |              |
| Office Supplies and Equipment        | 775.50       |              |       | 1,411.98     |              |         | 2,187.48        |              |
| Printing and Binding                 | 915.28       |              |       | 411.04       |              |         | 411.04          |              |
| Insurance                            | 962.00       |              |       | 915.28       |              |         | 962.00          |              |
| Maintenance and Repair               | 901.92       |              |       |              |              |         | 901.92          |              |
| Miscellaneous                        |              |              |       |              |              |         |                 |              |
| <b>Totals</b>                        |              | \$ 20,586.80 |       |              | \$ 10,649.76 |         |                 | \$ 31,236.56 |
| <b>EPIDEMIOLOGY AND RURAL HEALTH</b> |              |              |       |              |              |         |                 |              |
| Salaries                             | \$ 6,727.51  |              |       | \$ 6,896.85  |              |         | \$ 13,624.36    |              |
| Travel                               | 558.46       |              |       | 907.74       |              |         | 1,466.20        |              |
| Office Supplies and Equipment        | 384.47       |              |       | 567.83       |              |         | 932.30          |              |
| Arsenicals                           | 5,075.09     |              |       | 2,173.68     |              |         | 7,248.77        |              |
| Biologicals                          | 1,814.89     |              |       |              |              |         | 1,814.89        |              |
| Literature and Films                 | 211.90       |              |       | 303.26       |              |         | 515.16          |              |
| Maintenance and Repair               | 318.08       |              |       | 230.25       |              |         | 548.33          |              |
| <b>Totals</b>                        |              | \$ 15,000.40 |       |              | \$ 11,079.61 |         |                 | \$ 26,170.01 |
| <b>HYGENIC LABORATORY</b>            |              |              |       |              |              |         |                 |              |
| Salaries                             | \$ 22,123.59 |              |       | \$ 14,652.11 |              |         | \$ 36,775.70    |              |
| Travel                               | 1,121.84     |              |       | 1,158.65     |              |         | 250.49          |              |
| Office Supplies and Equipment        | 1,681.94     |              |       | 1,285.06     |              |         | 2,967.00        |              |
| Scientific Supplies and Equipment    | 212.45       |              |       | 8,204.52     |              |         | 8,416.97        |              |
| Animals and Animal Expense           | 383.04       |              |       | 1,218.69     |              |         | 1,601.73        |              |
| Maintenance and Repair               | 263.36       |              |       |              |              |         | 263.36          |              |
| Printing and Binding                 | 39.05        |              |       | 266.12       |              |         | 305.17          |              |
| Permanent Improvement                | 285.51       |              |       | 525.35       |              |         | 810.86          |              |
| <b>Totals</b>                        |              | \$ 25,110.78 |       |              | \$ 26,310.50 |         |                 | \$ 51,421.28 |
| <b>SANITARY ENGINEERING</b>          |              |              |       |              |              |         |                 |              |
| Salaries                             | \$ 13,337.74 |              |       | \$ 9,347.95  |              |         | \$ 22,685.69    |              |
| Travel                               | 1,036.34     |              |       | 1,352.91     |              |         | 2,387.25        |              |
| Office Supplies and Equipment        | 1,482.33     |              |       | 1,442.04     |              |         | 2,924.37        |              |
| Scientific Equipment                 | 399.23       |              |       | 200.42       |              |         | 599.65          |              |
| Printing and Binding                 | 45.58        |              |       | 107.73       |              |         | 153.31          |              |
| Maintenance and Repair               | 935.29       |              |       |              |              |         | 935.29          |              |
| <b>Totals</b>                        |              | \$ 17,236.51 |       |              | \$ 12,451.05 |         |                 | \$ 29,687.56 |

## TWENTY-SECOND BIENNIAL REPORT

## ITEMIZED DIVISIONAL EXPENDITURES—(Continued)

|                                   | State        | Total State  | Federal     | Total Federal | State & Federal | Grand Total  |
|-----------------------------------|--------------|--------------|-------------|---------------|-----------------|--------------|
| <b>VITAL STATISTICS</b>           |              |              |             |               |                 |              |
| Salaries                          | \$ 13,455.00 |              | \$ 9,221.94 |               | \$ 22,676.94    |              |
| Travel                            | 48.40        |              | 1,126.86    |               | 2,680.50        |              |
| Office Supplies and Equipment     | 1,553.64     |              | 1,734.02    |               | 1,528.56        |              |
| Printing and Binding              | 794.54       |              |             |               | 226.00          |              |
| Maintenance and Repair            | 226.00       |              |             |               |                 |              |
| <b>Totals</b>                     |              | \$ 16,077.58 |             | \$ 11,082.82  |                 | \$ 27,160.40 |
| <b>FOOD AND DRUG</b>              |              |              |             |               |                 |              |
| Salaries                          | \$ 11,250.00 |              | \$ 6,507.50 |               | \$ 17,757.50    |              |
| Travel                            | 156.90       |              | 2,291.61    |               | 2,448.51        |              |
| Office Supplies and Equipment     | 428.94       |              | 911.91      |               | 1,340.85        |              |
| Scientific Supplies and Equipment | 294.31       |              | 299.76      |               | 594.07          |              |
| Printing and Binding              | 165.03       |              | 212.65      |               | 377.68          |              |
| Maintenance and Repair            | 412.54       |              | 226.75      |               | 639.29          |              |
| Purchase of Samples               | 129.79       |              | 51.13       |               | 180.92          |              |
| <b>Totals</b>                     |              | \$ 12,837.51 |             | \$ 10,501.31  |                 | \$ 23,338.82 |
| <b>INDUSTRIAL HYGIENE</b>         |              |              |             |               |                 |              |
| Salaries                          | \$ 12,898.85 |              | \$ 390.00   |               | \$ 13,288.85    |              |
| Travel                            | 1,524.83     |              | 799.42      |               | 2,324.25        |              |
| Office Supplies and Equipment     | 467.59       |              | 375.22      |               | 842.81          |              |
| Scientific Supplies and Equipment | 148.55       |              | 334.27      |               | 482.82          |              |
| Printing and Binding              | 23.20        |              |             |               | 23.20           |              |
| Maintenance and Repair            | 482.69       |              |             |               | 482.69          |              |
| Miscellaneous                     |              |              | 83.76       |               | 83.76           |              |
| <b>Totals</b>                     |              | \$ 15,545.71 |             | \$ 1,982.67   |                 | \$ 17,528.38 |
| <b>MERIT SYSTEM</b>               |              |              |             |               |                 |              |
| <b>Totals</b>                     |              |              |             | \$ 4,973.87   |                 | \$ 4,973.87  |
| <b>PLAQUE INVESTIGATION</b>       |              |              |             |               |                 |              |
| Salaries                          | \$ 4,240.17  |              |             |               | \$ 4,240.17     |              |
| Truck Expense                     | 544.42       |              |             |               | 544.42          |              |
| Scientific Supplies and Equipment | 95.72        |              |             |               | 95.72           |              |
| <b>Totals</b>                     |              |              |             | \$ 4,880.31   |                 | \$ 4,880.31  |

## MONTANA STATE BOARD OF HEALTH

## ITEMIZED DIVISIONAL EXPENDITURES—(Continued)

| TRAINING                          | State        | Total State | Federal      | Total Federal | State & Federal | Grand Total   |
|-----------------------------------|--------------|-------------|--------------|---------------|-----------------|---------------|
| Shipends                          | \$ 50.00     |             | \$ 2,694.10  |               | \$ 2,744.10     |               |
| Tuition                           | 25.00        |             | 540.50       |               | 565.50          |               |
| Travel                            | 104.70       |             | 176.65       |               | 281.35          |               |
| Totals                            |              |             |              | \$ 3,411.25   |                 | \$ 3,590.95   |
| FIELD TRAINING                    |              |             |              |               |                 |               |
| Salaries                          |              |             | \$ 229.25    |               | \$ 229.25       |               |
| Travel                            |              |             | 23.74        |               | 23.74           |               |
| Totals                            |              |             | \$ 252.99    |               | \$ 252.99       |               |
| CRIPPLED CHILDREN                 |              |             |              |               |                 |               |
| Salaries                          | \$ 23,200.53 |             | \$ 2,703.79  |               | \$ 25,904.32    |               |
| Doctors fees and Treatment        | 9,816.77     |             | 10,070.64    |               | 19,887.41       |               |
| Hospitalization                   | 22,283.03    |             | 20,435.71    |               | 42,733.4        |               |
| Travel                            | 12,193.04    |             | 51.32        |               | 12,244.36       |               |
| Appliances                        | 1,624.71     |             | 12.00        |               | 1,636.71        |               |
| Office Supplies and Equipment     | 649.08       |             | 22.14        |               | 671.22          |               |
| Scientific Supplies and Equipment | 54.29        |             |              |               | 54.29           |               |
| Communications                    | 630.57       |             |              |               | 630.57          |               |
| Clinic Expense                    | 87.48        |             | 38.40        |               | 125.88          |               |
| Printing and Binding              | 155.77       |             | 50.00        |               | 155.77          |               |
| Contingent                        | 191.96       |             |              |               | 241.96          |               |
| Purchase of Automobile            | 783.00       |             |              |               | 783.00          |               |
| Totals                            |              |             | \$ 71,675.23 |               |                 | \$ 105,059.23 |
| MATERNAL AND CHILD HEALTH         |              |             |              |               |                 |               |
| Salaries                          | \$ 11,845.45 |             | \$ 8,239.30  |               | \$ 20,084.75    |               |
| Physicians Fees                   |              |             | 2,248.00     |               | 2,248.00        |               |
| Travel                            | 150.51       |             | 3,247.20     |               | 3,397.71        |               |
| Office Supplies and Equipment     | 344.43       |             | 2,617.77     |               | 2,962.20        |               |
| Scientific Supplies and Equipment |              |             | 462.58       |               | 462.58          |               |
| Communications                    |              |             | 2,251.33     |               | 2,251.33        |               |
| Printing and Binding              |              |             | 2,277.80     |               | 2,277.80        |               |
| Publications for Distribution     |              |             | 1,521.77     |               | 1,521.77        |               |
| Contingent                        | 54.50        |             |              |               | 54.50           |               |
| Totals                            |              |             | \$ 12,394.89 |               |                 | \$ 22,867.75  |
|                                   |              |             |              |               |                 | \$ 35,262.64  |
|                                   |              |             |              |               |                 | 85            |

ITEMIZED DIVISIONAL EXPENDITURES—(Continued)

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TWENTY-SECOND BIENNIAL REPORT

|                                | State        | Total State | Federal       | Total Federal | State & Federal | Grand Total   |
|--------------------------------|--------------|-------------|---------------|---------------|-----------------|---------------|
| <b>PUBLIC HEALTH NURSING</b>   |              |             |               |               |                 |               |
| Administrative Salaries        | \$ 6,000.00  |             | \$ 17,470.39  | \$ 23,470.39  |                 |               |
| County Nurses Salaries         |              |             | 30,427.79     | 30,427.79     |                 |               |
| Administrative Travel          |              |             | 5,211.66      | 5,211.66      |                 |               |
| County Nurses Travel           |              |             | 519.23        | 519.23        |                 |               |
| Moving and Building Repair     |              |             | 514.42        | 514.42        |                 |               |
| <b>Totals</b>                  |              | \$ 6,000.00 |               | \$ 54,143.49  |                 | \$ 60,143.49  |
| <b>PUBLIC HEALTH EDUCATION</b> |              |             |               |               |                 |               |
| Salaries                       | \$ 326.24    |             | \$ 8,855.78   | \$ 8,855.78   |                 |               |
| Travel                         |              |             | 2,787.80      | 2,787.80      |                 |               |
| <b>Totals</b>                  |              | \$ 326.24   |               | \$ 11,643.58  |                 | \$ 11,969.82  |
| <b>DENTAL HYGIENE</b>          |              |             |               |               |                 |               |
| Salaries                       | \$ 925.00    |             | \$ 1,175.00   | \$ 2,100.00   |                 |               |
| Travel                         |              |             | 148.82        | 148.82        |                 |               |
| <b>Totals</b>                  |              | \$ 925.00   |               | \$ 1,323.82   |                 | \$ 2,248.82   |
| <b>CASCADE COUNTY</b>          |              |             |               |               |                 |               |
| Salaries                       |              |             | \$ 16,259.22  | \$ 16,259.22  |                 |               |
| Travel                         |              |             | 274.00        | 274.00        |                 |               |
| <b>Totals</b>                  |              |             | \$ 16,533.22  |               |                 | \$ 16,533.22  |
| <b>FERGUS COUNTY</b>           |              |             |               |               |                 |               |
| Salaries                       |              | \$ 490.80   |               | \$ 490.80     |                 | \$ 490.80     |
| Travel                         |              |             |               |               |                 |               |
| <b>Totals</b>                  |              |             |               |               |                 |               |
| <b>GALLATIN COUNTY</b>         |              |             |               |               |                 |               |
| Salaries                       | \$ 8,509.61  |             | \$ 8,509.61   |               |                 |               |
| Travel                         | 1,181.34     |             | 1,181.34      |               |                 |               |
| <b>Totals</b>                  |              |             | \$ 9,690.95   |               |                 | \$ 9,690.95   |
| <b>LEWIS AND CLARK COUNTY</b>  |              |             |               |               |                 |               |
| Salaries                       | \$ 562.50    |             | \$ 562.50     | \$ 562.50     | \$ 562.50       |               |
| Travel                         |              |             |               |               |                 |               |
| <b>Totals</b>                  |              |             |               |               |                 |               |
| <b>MISSOULA COUNTY</b>         |              |             |               |               |                 |               |
| Salaries                       | \$ 10,422.49 |             | \$ 10,422.49  |               |                 |               |
| Travel                         | 954.48       |             | 954.48        |               |                 |               |
| <b>Totals</b>                  |              |             | \$ 11,376.97  |               |                 | \$ 11,376.97  |
| <b>GRAND TOTALS</b>            |              |             | \$ 259,593.22 |               |                 | \$ 473,575.57 |
|                                |              |             | \$ 213,986.35 |               |                 |               |







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